THE INTERNATIONAL MAGAZINE FOR 3D ARTISTS

3D world

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3Dworld 32

EXPERT TIPS FOR CINEMA 4D LIGHTWAVE 3DS MAX MAYA

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LOOK TO THE FUTURE

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>> LIGHTWAVE DISCOVERY EDITION
>> 75-MINUTE 3D BUZZ LIGHTWAVE VIDEO
>> UNIVERSE 5.0 AND SWIFT 3D V3 DEMOS

EXCLUSIVE REVIEWS

>> SOFTIMAGE|XSI 3.0 >> SWIFT 3D V3

ISSUE 32 THIS COVER CD ALSO INCLUDES

20 fully tiled *Texturama* textures – royalty-free and ready to use >> *Rock Monsters* and *Gas Explosion Simulation* videos >> 20 bonus Exhibition images >> Supporting files and screenshots for tutorials and Q&As printed within the magazine

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next issue
issue 33 out 29/11/02

LOOK TO THE FUTURE ISSUE
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Formula for Low Poly Photorealism

Textured Models & Planes used in this Scene:

840 Polygons
Panoramic Sky Dome

+

67 Polygons
All Trees, Shrubs & Flowers

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All Animated People

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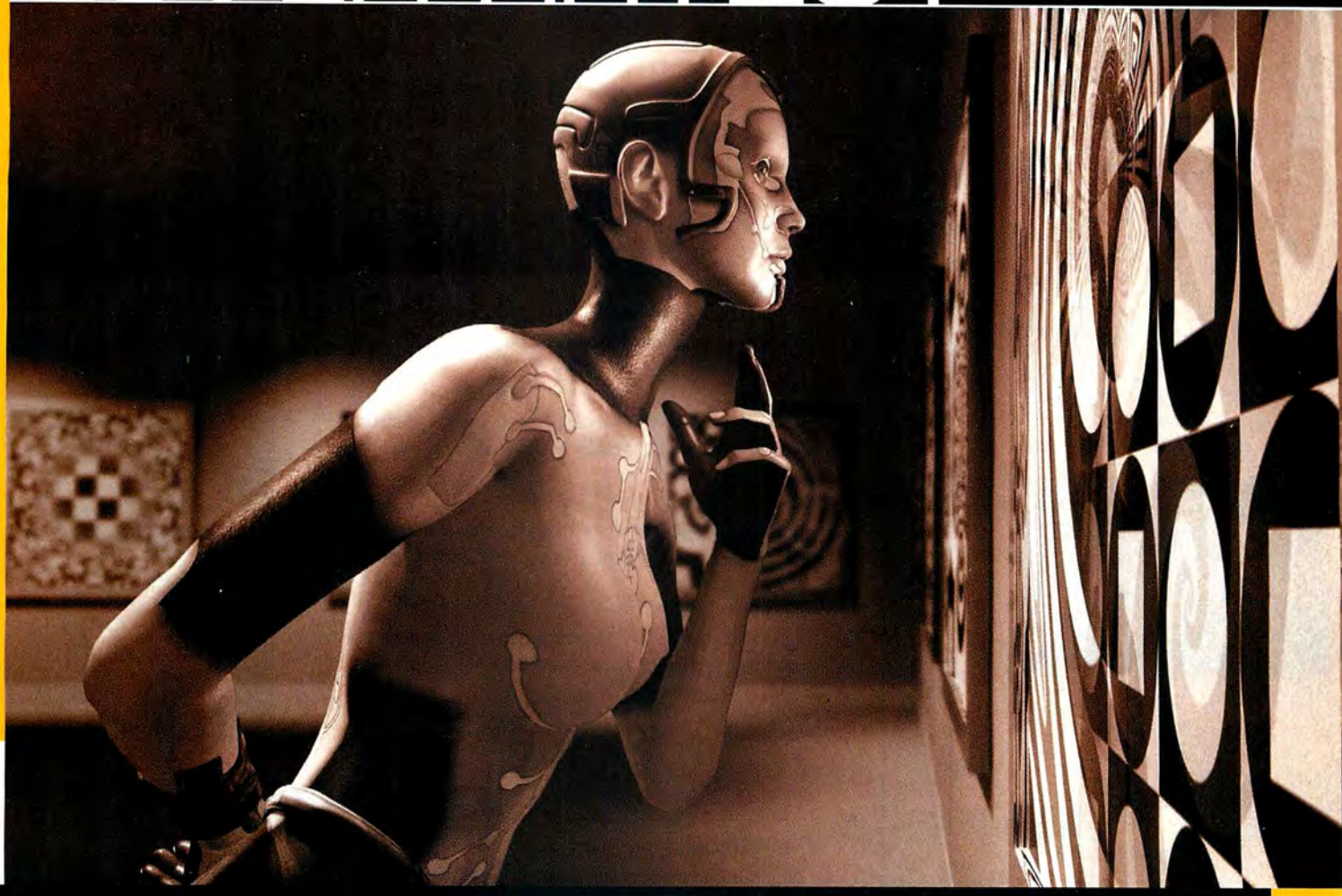

Adam Benton

TITLE: THE AI CRITIC
USING: *BRYCE 4, POSER PRO PACK, PHOTOSHOP 6*

"I am a freelance illustrator and designer, and have been working professionally in CG for about four years now. I started with 2D packages such as ***Photoshop*** and ***Painter***, and used ***Infini-D*** for the occasional 3D element, but it was when I was introduced to ***Bryce 4*** that my creative world started expanding rapidly. ***Bryce*** has limitations, and is often underrated by other pros, but for me as a jobbing illustrator, it's my favourite tool to produce quality visual ideas fast. I now use ***Cinema 4D*** for most of my modelling requirements, which I find very intuitive, but often revert to ***Bryce*** for the final scene set up and render.

I produce imagery for all purposes, of almost any subject matter required, and I thrive on a good challenge! A recent 'kudos' job I completed was four poster-size winter athletes for a Visa/Salt Lake 2002 advertising campaign commissioned by Saatchi & Saatchi. For my personal work, my inspiration comes from anywhere – films, books, and other artists work – but I always try to make a scene cinematic or photographic in some way. 'Believable reality with a twist of improbability' has always been my motto.

I created the AI character for Daz 3D's Victoria ***Poser*** model. I created her textures in ***Photoshop 6***, and modelled the helmet, arm, and waist props in ***Cinema 4D***. The props were parented to the figure, posed in ***Poser Pro Pack***, and imported into ***Bryce 4***, where the gallery was created and the final render took place. I performed all the post-work in ***Photoshop*** using alpha masks and various filters. I went for a slightly grainy, sepia tint to enhance the photographic quality of the image."

[e]: adam.benton@kromekat.com
[w]: www.renderosity.com/gallery.ez?ByArtist=Yes&Artist=kromekat

PICTURE COURTESY OF: Renderosity

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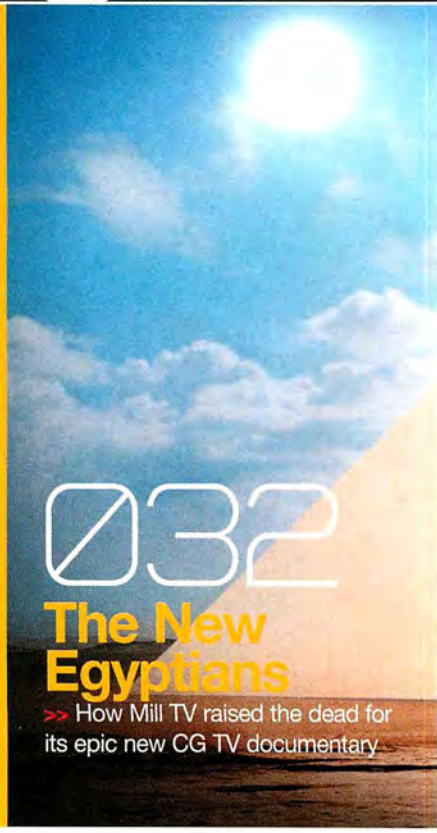

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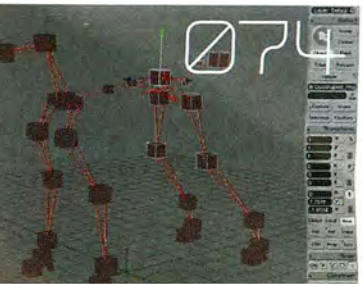

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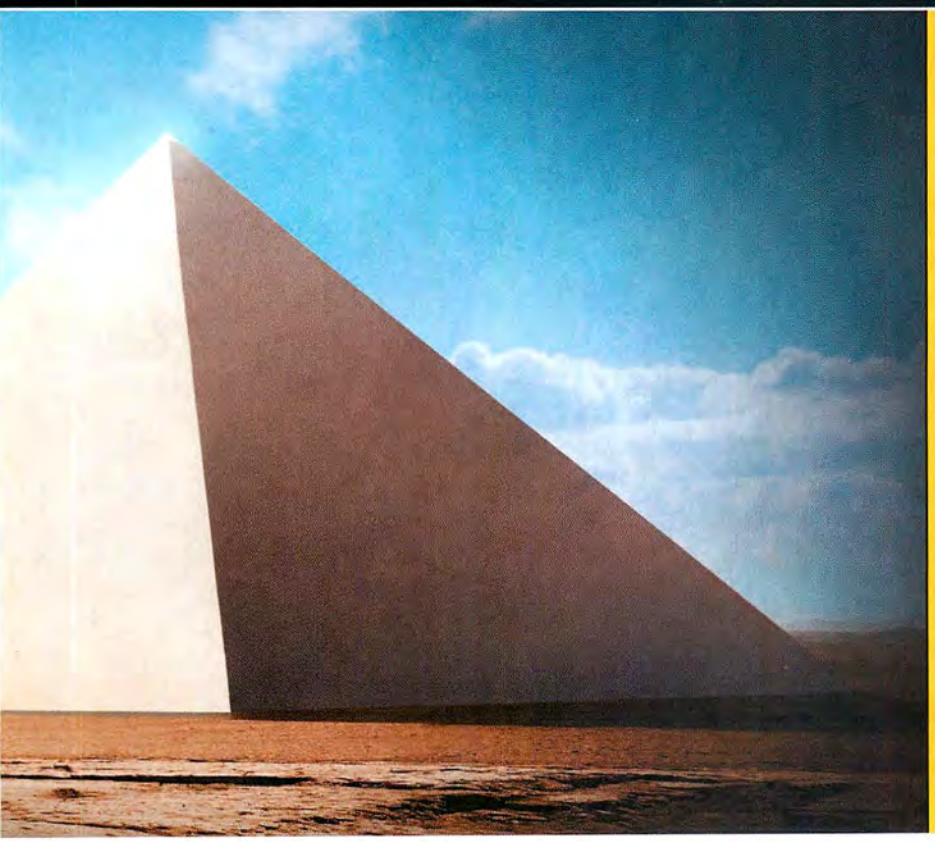

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CD CONTENTS & EDITOR #007

cd contents

SEND CD CONTENT TO: matt.gallimore@futurenet.co.uk

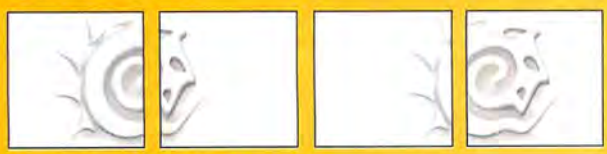
PC ONLY

Axel 1.0 full product

Generate 3D Web content with this full commercial product, as sold for £788. See the tutorial on page 57 to get started (demo of *AXELedge 1.5* also included)

>> **www.mindavenue.com**

DUAL FORMAT



LightWave 7.5 Discovery Edition

Try all the features of *LightWave 7.5* without shelling out for the full version. (Can't save objects with over 400 points, and all renders are watermarked)

>> **www.newtek.com**

DUAL FORMAT

Swift 3D V3 demo

Try the demo version of Electric Rain's 3D Flash package *Swift 3D*. The only limitation of this trial version is that after rendering, you can't actually generate a file

>> **www.swift3d.com**

MAC ONLY

Electric Image Universe 5 demo

The latest release of *Electric Image Universe* features radiosity and multi-processor support. Read our review on page 76, then try the demo (save/export disabled)

>> **www.electricimage.com**

PLUS

3D BUZZ LIGHTWAVE 7.5 VIDEO TUTORIAL
Jason Busby from 3D Buzz demonstrates how to rig characters in *LightWave 7.5*

TEXTURAMA TEXTURES
20 fully tiling textures from the Texturama urban textures collection (www.texturama.com)

EXHIBITION
Send your pics or animations to **3dw.exhibition@futurenet.co.uk**

Full listings inside the CD sleeve

Software not working as expected? Can't find those tutorial files? Check out the instructions inside our CD inlay for the solutions to the most common disc-related problems

editor's perspective

There are, recent market research reveals, four things in life feared more than any other: terrorist atrocities, Brussels sprouts, being caught short of paper in a public lavatory – and market research itself.

Not that market research is a bad thing, you understand: merely that it uncovers truths about the world that people would prefer remain hidden. Theatre companies, for example, may not have welcomed the recent survey that proved that nine-year-olds could name more characters from Pokémon than from literature, but at least it enabled them to put off the children's matinees of *Romeo and Juliet* – presumably in favour of the hard-hitting modern drama *Pikachu and Squirtle*.

And it was in this spirit of forewarning that we commissioned this month's cover feature. Based on our own market research, we identified the six most important questions facing the 3D industry and put them to the heads of the major studios. Their answers were sometimes predictable, sometimes surprising, but always revealing. Whatever future you want to plan for yourself in computer graphics – whether it's a matter of choosing whether to work abroad or merely which software package to adopt – we strongly suggest you read our findings first.

Elsewhere in the issue, our panel of experts bring you their tips for creating better particles, Mill TV explains its work on its latest effects-heavy archaeology series, *Pyramid*, and Jellyfish Pictures explains the rigging system used for the characters in its latest commercial – itself a simplified version of the one used by many of the major studios.

And this month's CD is just as packed. Alongside a full version of *AXEL 1.0*, for which you'll find a tutorial on page 57, we've brought you the *LightWave Discovery Edition* – a full, non-commercial version of NewTek's flagship app – plus accompanying 3D Buzz tutorial video, and not one but two exclusive demos: *Electric Image Universe 5.0* and *Swift 3D V3*.

Next issue, we'll be bringing you another piece of research: our first reader survey in over two years. Fill it in and let us know what you think of the magazine. I'm already campaigning to have all questions about the role of the editor excised...

JIM THACKER Editor
jim.thacker@futurenet.co.uk

MAILBOX

BY POST: 3D World, Unit 1+2 Cotterell Court, Bath, BA1 2NP, UK

letter of the month

On the letters page of issue 31, there were a few people complaining that your magazine was either making its tutorials too difficult, or that it was concentrating on the 'wrong' packages (that is, not the one they were using). Well, stop whining, people: read the articles and use some imagination. Take what is said and apply it to your own package – and if the article is too difficult, cut it out and keep it for a year. If you really need to learn the basics, buy a book.

Personally, I like *3D World* the way it is. Many times the articles show me another way to do things – not always better, but the more ways you know to do something, the better you'll be in the long run, and surely that's what we're all striving for: to be better, faster, more imaginative, and ultimately, richer. (I don't subscribe to this 'starving artist in a garret' stuff).

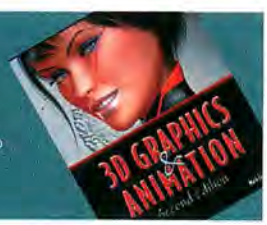
But while I'm writing, one very small gripe. Why are some of the movies on the CD in a format that can't be played using a Mac? I know the software they are talking about is only available on PC [our most recent tutorial videos covered *Houdini* and *3ds max*], but it's still nice to see things done in other packages – if only to gain inspiration. Surely, it would be possible to convert all the movies to MPEG format so that they could be viewed on any machine?

Stuart Neil | via email

Fighting words, Mr. Neil. But before we receive a flood of emails demanding Stuart's head on a pole, allow me to point out that next issue,* 3D World *will be having its first readership survey in over two years – and that that might be a better place to vent your spleen. For one thing, you won't run the risk of pesky journalists editing your finely honed invective, and for another, you could win one of a number of fabulous prizes. As for the whole vexed CD/codec question, we'll return to that later on this page.

WRITE IN AND WIN A PRIZE!

Each issue, we award a small prize to the author of our Letter of the Month. Next issue, it's a copy of *3D Graphics and Animation* by Mark Giambruno: the second edition of his popular beginners' guide to CG artwork. Thanks to the nice people at Pearson Education, you can also order the book at a special 30% reader discount from our sister website: **http://books.maximumpc.co.uk**



CRASHED COURSE

My subscription to your excellent magazine is almost at an end, and I must say that I have thoroughly enjoyed every issue, and have found useful and practical information in all of them. Except, however, for issue 30. Actually, that's not fair: I'm talking more specifically about one article, the eight-page 'Crash course in game design'.

I have a day job to pay the bills, and in the evenings I work on a portfolio that hopefully will soon land me a job in videogames. You can imagine my excitement then when I saw the cover of issue 30 – at last, some information on how best to break into the industry!

Unfortunately, not so. I discovered that the eight pages contained vague and general information that appeared to be aimed at an audience entirely ignorant of computer games, rather than at CG artists. There seemed to be more criticism of bad games and what not to do than there was useful information.

I understand that the games industry is a broad field and that there are numerous types of roles and software, with each studio looking for specific qualities. But there is a degree of standardisation and I had been hoping to get some details on the overall requirements most studios look for. Regardless, I enjoyed the remainder of the issue, and will certainly be renewing my subscription.

Andrew Allen | Via email

Our crash course in games design elicited a lot of feedback: approximately two thirds of it positive, the other third along the lines that Andrew sets out so eloquently above. That particular article was aimed at artists with a basic understanding of 3D techniques, but little knowledge of the videogames industry. However, there's clearly a lot more to be said on the subject, and it's one we'll be returning to in future issues.

Issue 30's crash course in games design: not enough detail, says Andrew Allen. But we'll be returning to the subject in future issues

VIDEOS: GOOD

My compliments for the video tutorials found recently on the *3D World* CD-ROMs. Producing videos is a great idea, and the tutorials are great fun to follow, particularly those from Jason Busby of 3D Buzz. Thanks a lot, and keep up the good work.

Benny Chew | The Netherlands

Many thanks to Benny, who describes himself, somewhat mischievously, as a 'Computer Arts subscriber'. (Cue shower of paper darts and abuse from the Computer Arts team, sitting ten feet away on my left.) However, tutorial videos are only a good idea if you can play them, as this next letter proves...

VIDEOS: BAD

Help! Since I first purchased issue 10, I haven't been able to stop buying *3D World*. I swear it's a monthly addiction, and it's all your fault!

Well, enough sucking up. Now my rant. I just can't seem to find the software required by some of the movie files on your CD. And no, the codec needed does not just download automatically over the Net. As a matter of fact, it's almost always unfindable!

Please get the authors of these films to supply the damn codecs on the CD or to supply a link to where they can be found before my head explodes!

DJ Mouser | Australia

Codecs, frankly, are a problem. We can't just put

uncompressed video on the CD – not, at least, if we want to be able to include any other content – so we have to strike a balance between file size, image quality, and a format that the majority of our readers can use. Our recent switch to DivX allows us to include the necessary player software on the disc – providing you're using a PC. For all you frustrated Mac OS/Linux fans out there, an alpha version of the relevant player is available for download from www.divx.com, although for legal reasons, we can't include it on the CD.

HOUDINI BLUES

May I say how disappointed I am at the moment – and after feeling so good when I went into my local newsagent and saw that issue 30 of *3D World* had the *Houdini Apprentice Edition* on the disc.

I couldn't believe that this was true, so I looked at the CD cover, scanned the contents page, and even read your editor's viewpoint column. But I couldn't find any reason to stop me trying out such a top program, so I paid my £6.00 and headed home a happy man.

As soon as I could, I loaded the disc and decided to watch the accompanying video tutorial, which I thought was very good. Then it happened. Not wanting to miss any of the film, I reached for a cup of tea, and the disc case fell on the floor. I checked to see if it was damaged – at which point I saw the inlay card. There they were, the specs for the system needed to run *Houdini*. Needless to say, if these are correct, I cannot use the program.

In future, I will not buy another issue of your magazine – regardless of what it has on the disk – without seeing some information up front on what's needed to run the software.
C Speed | Via email

Our apologies to anyone who has suffered similar disappointments with* 3D World *cover software. We do point out whether a program is dual-format, PC only, or Mac only on both the CD cover and the contents page, but space often prevents us from including a full system specification. However, the requirements for* Houdini Apprentice Edition *(Windows NT4 or better) are the same as those for the PC version of any equivalent 3D package (*3ds max 5, Maya 4.5, *or* SoftimageXSI 3.0*), and it's worth bearing this in mind when buying future issues of the magazine.

AN XSI FAN WRITES

After using the *SoftimageXSI Experience 2.0* CD, I decided to dive in and get the full version. So in July 2002, I made the switch from another application, which I had been using for six years, to *XSI*. From that moment, I knew that this was the one and only application I was going to use for my animation needs.

Since then, my infatuation has turned into a physical one. I now have an *XSI*-logo tattoo, and just recently modded my PC case, mouse, and keyboard based on Softimage's branding. The case took about five days to complete, including carving the logo, cutting out the window, priming, and painting.

Overall, it has been received well by the public and the folks at Softimage are in awe of my dedication to them and their product. I'm now a moderator on the *XSI* Base forum (www.xsibase.com) and a full time *XSI* evangelist.

And yes, I enjoy reading your magazine monthly – but would like to see (guess what?) *SoftimageXSI* covered more frequently in the tutorials section.
Will Mendez | via email

Good news for Softimage fans: our character rigging tutorial this month uses* XSI*, and we should be having a further Q&A devoted to the package in issue 33. As for Will's tattoo (pictured above), consider our gobs well and truly smacked. If anyone else has felt the need to modify their body, their PC, or their living space based on their 3D package of choice, please let us know. Bonus points will be awarded to anyone to have painted a full-scale trompe l'oeil mural of Bingo the Clown on their bathroom walls, or to have had the* LightWave *cow permanently branded onto their chests...

Houdini Apprentice Edition, as featured on the issue 30 cover CD. So beautiful. So powerful. So accessible. But why on earth doesn't it run in Windows 98, asks irate *3D World* reader C Speed?

***3D World* reader Will Mendez loves *SoftimageXSI* so much, he had the logo turned into a tattoo. Counsellors are standing by, just behind the lawyers...**

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DIGITAL ARTS WORLD SHOW REPORT

The UK's premier digital arts event hosted a string of new products and major speakers. Here's our rundown of the show's highlights

Digital arts shows are like buses: you wait a year, then four come along at once. Or so a visitor to Digital Arts World could be forgiven for thinking. The UK's premier computer graphics event, which ran from 9-11 October this year, brought together parts of the 3D Festival, the London Effects and Animation Festival, Digital Media World, and Future Publishing's own Computer Arts Live event.

All in all, some 6,000 people passed through London's Olympia showground during the three days of the festival, drawn by a mixture of major exhibitors, live demos and big-name speakers – some of which, we should point out (to forestall accusations of bias), were organised by *3D World* itself.

On the software side, most of the major manufacturers, including Discreet, Alias|Wavefront, Maxon, and REALVIZ were present and correct, or at least – in the case of NewTek – represented via their resellers. While most of the larger products on show had already been announced at SIGGRAPH or Mac Expo, the show did mark the first official UK showing of *Maya 4.5*'s powerful new fluid effects technology.

But it was to the games industry and the smaller manufacturers that one turned in order to see the newest products on show. NXN Software (www.nxn-software.com) was showing off *alienbrain 6.0* (see page 15), the latest version of its popular content-management software – rapidly becoming a standard among videogame developers – while Eyematic (www.eyematic.com) was showing off the first ever finished copy of *FaceStation 2*, the automatic facial animation package we previewed back in issue 29. In fact, facial animation was a bit of a theme at the show, with Russian/Californian start-up LifeMode Interactive (www.lifemi.com) choosing the event to launch the plug-in version of its games-oriented character creation package *LifeStudio:HEAD*. The package, which promises 'hand-tuned facial animations at $1 per frame', retails for $395 and plugs into either *Maya* or *3ds max*, offering a variety of powerful modelling and animation options, including automated lip-synch from WAV files. We hope to bring you a full review next issue.

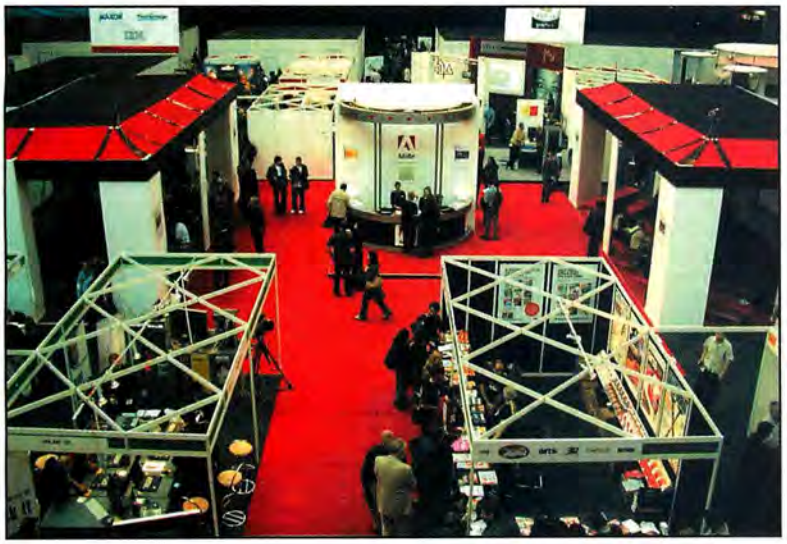
RIGHT **Lionhead Studios' Andy Bass (left) and Mark Healey conduct a typically relaxed session on the *3D World* stage**

FAR RIGHT **Crowds packed the stages and out into the aisles**

OPPOSITE, ABOVE **Most major software manufacturers were represented at the show**

OPPOSITE, BELOW RIGHT **3D Buzz founder Jason Busby takes to the stage. Fans begin to gather...**

OPPOSITE, BELOW LEFT **Aardman Animations round the show off in style with a presentation on the making of their recent TV ad for Comfort fabric conditioner**



For 3D fans, the highlight of the show was, of course, the 3D Festival/LEAF Conference, which featured a stellar speaker list, including Eric Barba of Digital Domain, Jay Redd, and Anthony LaMolinara of Sony Pictures Imageworks, and, seemingly, about half the staff of Industrial Light & Magic. You can read a personal round-up of the highlights from Shelley Page of DreamWorks on the right of this page.

But even for those without the £350 required for a three-day conference pass, Digital Arts World was a treasure trove of blue-chip speakers, in the shape of *3D World*'s own stage. Despite the sometimes uncertain sound quality, visitors flocked to see the likes of Lionhead Studios, Aardman Animations and The Moving Picture Company talk through their most recent work, packing out the seating and even standing in the aisles.

For regular *3D World* readers, the event also offered the chance to meet the people who create the magazine, particularly *LightWave* guru Ben Smith, who wowed the Wednesday crowds with his insights into how a one-man company can compete with the major studios to create high-quality work for large-format animations and TV.

But for many visitors, there was only one person to be seen with, and that was our regular video tutorial contributor Jason Busby, making a rare visit from the States. The 3D Buzz founder took to the stage at the end of the first day to explain his vision for the site and his plans for the future – including, excitingly, a free online distributed rendering service for *Maya* users.

"DIGITAL ARTS WORLD WAS A TREASURE TROVE OF BLUE-CHIP 3D SPEAKERS"

So many fans wanted to meet Jason that, even half an hour after the end of his presentation, it was only possible to clear the stage by suggesting that the meeting be adjourned to a more suitable venue – the bar of the Hand and Flower, situated conveniently a hundred metres up the road.

But for those of you who missed the show, fear not: Jason has agreed to come back next year and do *two* presentations at Digital Arts World 2003. We hope to see you there!

on the web

NewTek Texture Collection
NewTek has made a high-resolution image resource available for free download from its website. The initial release of the NewTek Texture Collection includes just fifty high-resolution textures, but more will be added from time to time. Subjects for the first set include Wood, Metal, Sky, Nature, and Stone. All textures are unretouched photographic images at 1,600 x 1,200 resolution in JPEG format.
www.newtek.com/freestuff

Model French website
Explore a *max* scene and download its models and textures at the beautifully styled Vocanson Multimedia website.
www.vocanson.com/D7_scenes3d.htm

Free fowl play
Anyone disappointed to discover that Christopher De Santis' hilarious CG animated short, *Fowl Play!* was no longer available for download will be glad to know it's back up and running on the Spitfire Filmworks website.
www.spitfirefilmworks.net/fowl_play.htm

A bit of waffle
Framestore CFC's 'Cow and Bear' commercial for Kellogg's Eggo Waffles is available for viewing on the company's website. The 30-second 'Cow and Bear' spot was made with Framestore CFC's new interactive system that links London, Chicago, and Los Angeles over the Internet, transforming the postproduction process.
www.framestore-cfc.com/commercials

INDUSTRY VIEW
DIGITAL ARTS WORLD 2002

DreamWorks' Shelley Page reviews the highs and lows...

"This year's Digital Arts World event was a successful combination of several different events, including the London Effects and Animation Festival (LEAF) and the 3D Festival, previously held in Copenhagen. As a frequent participant of both events I felt that many good things came out of this year's collaboration. In particular, the variety and quality of the presentations was a considerable improvement on last year.

Although there was often inevitable frustration in trying to be in two or three places at once, this was outweighed by the richness and variety of the 'menu'. Delegate numbers seemed to be up on last year and even the smaller sessions I attended were able to compete, although audience numbers tended to fluctuate.

Having the presentations on the same floor as the exhibitors generated an energetic atmosphere where the all-important art of networking flourished! On the down side the technical difficulties of the Olympia venue proved to be hard to overcome. The noise levels outside all the presentation areas often made it impossible to concentrate. It was a challenge for speakers to hear themselves at times – *Dinotopia* vs *Lord of the Rings* was a case in point! Excessive light on the screens was also a gripe from delegates.

Those problems aside, the event achieved the purpose of reminding us what an incredibly stimulating, innovative, and exciting industry we work in! Personal highlights from the presentations include Carlos Saldanha, co-director of *Ice Age*, Jason Schleifer and Matt Aitken on *Lord of the Rings*, Frank Petzold of Tippett Studio on the hilarious 'Carl and Ray' commercials, and all of the panel sessions I attended.

I also greatly enjoyed hosting the 3D Film Festival, a new addition this year from the 3D Festival. It was yet another reminder that this industry deserves the chance to celebrate the creators of so much amazing work."

Shelley Page is European Representative for DreamWorks, and was a moderator at the 3D Festival/LEAF conference. You can read her Viewpoint column on page 20 of the issue

Mental ray now free to Maya 4.5 users

Aggressive Alias|Wavefront marketing strategy sees £3,350 renderer up for free download

A sample render produced with *mental ray for Maya*. The renderer, formerly sold for £3,350, is now being made available for free download

And so the course of the 3D industry takes another unexpected turn. As this issue went to press, Alias|Wavefront announced that every registered user of *Maya 4.5* can now download and use *mental ray for Maya 1.5* for free.

The move places one of the industry's best rendering solutions, previously available for £3,350 into the hands of every *Maya* user.

"We've been working on this for 18-24 months," said Shai Hinitz, *Maya* product manager at Alias|Wavefront's Toronto headquarters. "It's a combination of motivation from customers, together with an internal desire to boost the functionality and feature set in *Maya*."

So is this an admission of the weakness of *Maya*'s own renderer? "Not at all," claims Hinitz. "About 75% of the installed user base use the *Maya* native software render and love it. We are committed to maintaining it as viable solution."

The timing of the announcement might be seen as a spoiler, given the imminent release of *Softimage|XSI 3.0* and Pixar's *PRMan 11*, a view that Hinitz was keen to refute: "We do what makes the most sense for our users and our customers. I don't even know what our competitors' schedule is," he said. "We continue to embrace any customer's choice of renderer. Pixar was one of the first companies we approached to make sure it was okay with them."

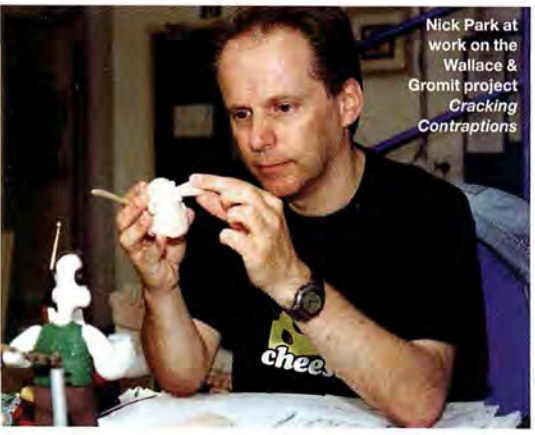
Others weren't so fortunate. Michael Stojda, MD of Softimage said: "This move was typical of Alias|Wavefront's overhyped marketing. If *mental ray* had been selling they wouldn't have needed to give it away. This is a reactive move to the growing popularity of *XSI*."

Clearly A|W's activities will have a serious impact on competing applications, and it sounds like there's more to come. "Our strategy is to bring *Maya* to as many creative artists as we can, explains Hinitz. "We don't intend to squash everyone else in the process. But we're doing really well, and as long as we continue to do really well, we will continue to be aggressive."

CONTACT:
www.aliaswavefront.com

A chance to network

UK's Shooting People network expands to embraces animators



Nick Park at work on the Wallace & Gromit project *Cracking Contraptions*

Shooting People, the UK's premier online filmmaking network, has expanded its brief to encompass animated content. Founded four years ago by Jess Search (who runs Channel Four's independent television and video department) and director Cath Le Couteur, the Shooting People network currently boasts more than 15,000 members, with membership expanding by 300 a week. Dedicated to assisting and bringing together the next generation of UK film talent, it currently runs six email networks dedicated to live film work, with daily Q&As covering creative and technical issues. The new Animation Network will deal with all aspects of animation and all formats, from *Macromedia Flash* to CG cartoon and digital effects work. In addition to giving animators their own specialist forum, the intention is to encourage new collaborations with filmmakers, writers, composers and so on. To mark the added support for animated work, Aardman's Nick Park has joined directors such as Danny Boyle, Mike Figgis, and Iain Softley as a Shooting People patron. Funded via a membership system, Shooting People charges a yearly fee of £20.

CONTACT: **www.shootingpeople.org**

BRAZIL REVIEW CLARIFICATION

Following our review of SplutterFish's *Brazil* rendering system in issue 31, we received a number of emails commenting on our assertion that the software does not support distributed rendering. To set the record straight, we contacted SplutterFish CEO Scott Kirvan. He said: "*Banshee*, SplutterFish's anticipated load-balanced distributed renderer for *Brazil r/s*, is currently in development and is what artists traditionally think of when they say 'distributed rendering'. But *Brazil r/s V1.0* does network render and it does ship with a distributed rendering solution. The distributed rendering solution is script-based and, although not an ideal solution, does work. More news on *Banshee* will be forthcoming as development progresses."
Apologies for any confusion caused.

UK studios triumph at 2002 LEAF Awards

Glassworks and Framestore CFC dominate the Effects and Animation awards as US giants scoop film prizes

Some of the biggest names in CG animation, including SPI and ILM, won gongs in this year's London Effects and Animation Festival (LEAF) awards. But away from the American acronyms, some of the most innovative work came from students and homegrown talent. The glittering awards ceremony, held in early October in London's famous Hippodrome nightclub, saw Framestore CFC scoop two awards and one joint winning nomination for *Dinotopia* (TV Series category), 'Champagne' (Commercials Live Action Effects category), and 'Mosquito' (Commercials Animation category).

The latter award was shared with Soho neighbours Glassworks for its Sprite Kebab spot. Glassworks also won the LEAF award for Visualisation and Simulation with Adrian Lark's Gravity 3D project, which simulates galaxies colliding in real time. The Glassworks Special Projects team also came runner up in this category with its Orange Arrows VRE – a realistic virtual reality driving experience of a Formula One car.

Glasgow-based Axis Animation had the audience in stitches with its 'Toy Story Auditions', which won the Titles, Idents, and Stings category. The three 20-second commercials for the *Toy Story 2* premiere on the Disney Channel features would-be thespian toys auditioning for a series of parts in the animated Pixar film, to hilarious effect.

Shynola, meanwhile, won top prize in the prestigious Pop Promo category with its excellent 'Eye for an Eye' video for Unkle. ILM won the best Feature Films category with *Star Wars Episode II*, beating off Sony Pictures Imageworks (SPI), PDI/DreamWorks and Mill Film in the process, but SPI had its revenge when it took the top spot in the Short Films category with *The ChubbChubbs* – a hilarious take on the *Star Wars* movies. Last but not least, *Tim Tom* by Supinfocom and *Marvel* by FilmAkadamie Baden Wurtemberg were joint winners of the Student Work category.

events

13-17 NOVEMBER
Holland Animation Film Festival
The biennial Holland Animation Film Festival seeks to show the international variety and quality of animated films. From *avant garde* to cartoons, the festival provides an interesting overview of recent films and historical retrospectives.
www.haff.nl

14-16 NOVEMBER
Forum International Des Technologies De L'animation
The International Forum for Animation Technologies brings together producers, studio managers, production executives, R&D leaders, broadcasters, software manufacturers, and content developers in a three-day event in Angouleme, France. Workshops include 3D character animation, production lines, motion capture, and feature films. More details are available on the website.
http://magelis.org

21-24 NOVEMBER
Tree Love
Escape the grey at the Tree Love exhibition at the PEA Gallery in Farringdon, London. Headed by a small collective of designers, the exhibition will comprise fresh and energetic work from a diverse selection of London creatives. See the website for exhibiting and visiting information.
www.treelove.info

3-5 DECEMBER
Asia Animation 2002
Asia Animation comprises two elements: an exhibition and a two-day conference, featuring some of the industry's leading international speakers.
www.asiaanimation.com.sg

TROUBLE AT THE MILL

After the restructuring of its Shepperton operation, which resulted in around 20 redundancies earlier this year, Mill Film has confirmed further changes at its central Soho facility. "We've just completed two hundred complex shots for the *Harry Potter* movie, so have scaled back the huge freelance team we had," confirmed Mill Film's Emma Shield. "And with that scaling back we also lost our five permanent support people and our facility director, Mark Sherwood."

Rather than bring in a direct replacement, Sherwood's role will now be handled by Andy Barmer (Commercials Director and the former facility director) and Derryn Clarke (Production Director). The facility is currently working alongside Cinesite, Moving Picture Company and Double Negative on *Tomb Raider 2*, which is due for release in the summer of 2003.
CONTACT: **www.millfilm.co.uk**
www.respower.com

5D CLOSES

Just before *3D World* went to press, news came through that image-processing software outfit 5D has closed. The independently owned UK company, which also operated a sales and support division in Los Angeles, had been a mainstay of the post industry. Launched in 1990 with *Jaws*, a Postscript interpreter program, it went on to enjoy success with groundbreaking morphing package *T-Morph* and the *5D Monsters* and *Masher* VFX and rendering programs. In 2000 it refocused its efforts on the film and TV markets, shipping the *5D Cyborg* media workflow and VFX software and *5D Colossus* grading and finishing application. Colorfront, the original developer of *Colossus*, looks set to take on customer support for *5D Colossus* customers in the short term, but the long-term future is still uncertain. A number of publishers in the postproduction sector are thought to be considering a purchase of 5D's core technologies. Expect further updates next month.
CONTACT: **www.five-d.com**

DIGITAL DOMAIN RELEASES NUKE

Commercial release looms for legendary effects studio's in-house compositing app

Noises were first made about Digital Domain taking its Academy award-winning compositing software, *Nuke*, to market at SIGGRAPH 2002 – but given that the software has been in use since its creation for use on *True Lies* in 1994, the most obvious question is why the studio has waited until now to capitalise its R&D department's work.

"It had crossed our minds that we could market [*Nuke*] and recover some development costs, but it wasn't until Apple acquired *Chalice*, *Rayz* and *Shake* that we really knew of its commercial potential," said Michael Taylor, Digital Studio's Vice President. "Apple has all but confirmed that it will only be supporting its own operating systems, but of course there's still a huge demand for PC. Since then, we've had a cacophony of noise at our front door, from people wanting to touch and feel the software."

Digital Domain initially considered finding a publishing or licensing partner before opting to form its own publishing arm, D2 Software. "It's going to be a separate entity, with its own support, development, and sales staff, and its own company head," explains Taylor.

Customers will be buying version 3.0 of *Nuke*, which was rewritten from the ground up eighteen months ago. This latest edition includes a number of major enhancements, not least support for high dynamic range imagery, which was used to full effect in several key effects shots for *The Time Machine*. Development of the software will obviously continue, but rather than have separate in-house and customer products, there will be just the one code tree in future. Taylor adds that Digital Domain itself will effectively become a customer of D2 Software.

"DIGITAL DOMAIN'S SOFTWARE ARM IS GOING TO BE A SEPARATE ENTITY, WITH ITS OWN SUPPORT, DEVELOPMENT, AND SALES STAFF"

"I thought we might need to look at the needs of the marketplace a little more, but evaluation of user feedback has shown the product is ready to go. Of course, it helps that it's been developed for and battle tested with our own projects."

Taylor isn't worried that Digital Domain might be giving away its advantage. "Just because I can buy a certain type of software, it doesn't necessarily give a competitive edge. The world has changed; it's now more about the talent of the people who use it."

D2 Software is clearly intended as much more than a small side venture. "Absolutely. We're already considering adding other internally developed applications to our product range. And beyond D2 Software, we're currently co-producing the movie *Secondhand Lions* [starring Michael Caine and Haley Joel Osmont] with New Line. The aim is to strengthen the company through diversification."

Nuke will be available next month on Windows, Linux, and Irix platforms, for around $10,000.

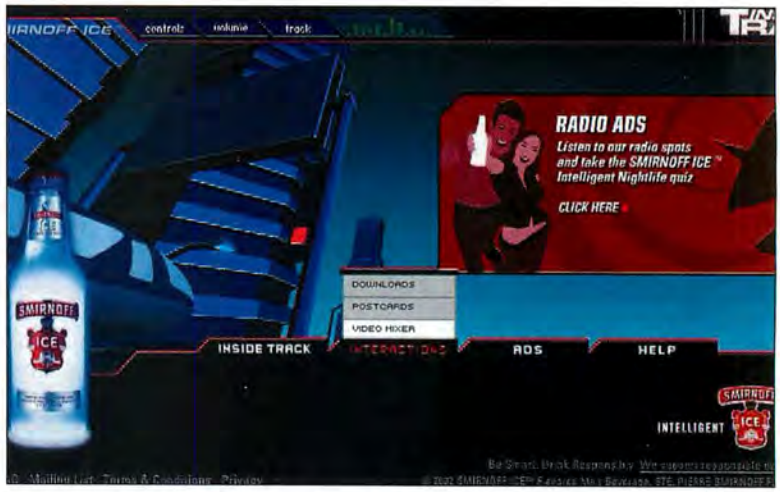
CONTACT: **www.d2software.com**

Swift 3D: Flash in the can

Version 3 of popular 3D vector animation tool now shipping

Electric Rain has begun shipping the latest edition of vector animation software *Swift 3D*. Version 3.0 of the industry-leading tool for 3D Flash design includes a range of new modelling and file handling features. Alongside support for 3DS and DXF input formats, users can now also import 2D vector art in AI or EPS formats for transformation into 3D models. Text entries and 2D bezier curves can be similarly extruded to create instant 3D designs, while the animation options include control of cameras and lighting, keyframe timeliness, and extensive object morphing. The vector rendering now handles overlapping shadows and reflections, while 'photorealistic' rendering takes advantage of reflections, wood and metal texture libraries, and procedurally generated textures for materials such as glass. The export options now includes support for extra raster formats, as well as the new *Swift 3D Flash* importer format. *Swift 3D V3* retails for $169, or $89 for an upgrade. You can read a full review on page 78 and check out the exclusive demo on the cover disc.

CONTACT: **www.swift3d.com**



The Smirnoff Ice site (www.smirnoffice.com) – just one of the projects completed with *Swift 3D V3*

Amorphium 2.0 unveiled

New frontend promised for idiosyncratic 3D modelling app

Electric Image has announced that *Amorphium Pro 2.0* is set for launch within the next two months, improving on the famously *Flash*-friendly 1.2 edition with a range of more sophisticated features and a completely new (and less idiosyncratic) frontend. *Amorphium Pro 1.2* enabled users to create 3D objects using real-time 2D brushes and design tools. Operating as a true windowed application, *Amorphium Pro 2.0* builds on the '3D software for 2D artists' sculpture and paint-based heritage of its predecessors, with a new set of tools collectively dubbed 'Tin'. These are *Amorphium*'s own implementation of Catmull-Clark Subdivision Surfaces modelling tools, and can be combined with the other modelling features for the creation of both hard surfaces and complex organic models. Also included is an extensive range of new modelling controls, a library of fresh material elements, plus new features – such as the ability to preview animation, and also to use *QuickTime* movies as backgrounds. In addition to releasing a version for Windows 98/ME/2000/XP, Electric Image also intends to support Apple's OS 10.2 Jaguar operating system. Prices have yet to be confirmed.

CONTACT: **www.electricimage.com**

NXN SHIPS ALIENBRAIN 6.0

NXN Software has launched version 6.0 of alienbrain, its videogames industry-standard asset-management package. In addition to a range of performance and user interface improvements, *alienbrain 6.0* combines digital asset and software configuration management functionality, making it the first such tool to allow both artists and coders to share project data within the same system.

"Traditionally, programmers and artists have worked on two separate file systems," commented NXN CEO Gregor vom Scheidt. "By eliminating this 'digital barrier', we've enabled something never done before in workflow management."

Although its film-specific cousin, *alienbrain VFX*, has yet to achieve the same sort of dominance in the visual effects market, *alienbrain* itself is currently in use at most major games developers throughout the world, including Sony, Electronic Arts, LucasArts Lionhead Studios and Infogrames. Studios using the software vary in size between three and several hundred people.

"With the new features, *alienbrain* becomes the only unified system that can meet the advanced needs of EA's teams," commented Electronic Arts' head of worldwide systems, Frank Russell.

Alienbrain 6.0 is available in Developer, Designer and Manager Client editions, price $690, $990 and $1,990 respectively. The software is currently shipping

CONTACT: **www.nxn-software.com**

Worley's G2 whizz

New LightWave lighting and shading system wows users

At long last, *G2*, the Worley Laboratories plugin that vastly upgrades *LightWave*'s lighting and shading system is ready to ship. The range of features it adds to the package is impressive, to say the least.

In addition to sub-surface scattering, G2 also includes a range of skin tools that use rendering algorithms to simulate the multiple translucent layer properties of human flesh. There's also accurate soft reflection calculation, area lights, single geometry set glass refraction modelling, edge tools, radiosity and ambient lighting control, and a number of new shading controls. *G2* also features compositing extras such as a Luminous Shadow Darkening tool (as seen in Worley's *Sasquatch* and *Gaffer* applications), as well as Photomapping and custom grain.

Crucially, all these new lighting and shading features (plus all regular *LightWave* functions) work in conjunction with an accurate, real-time preview system.

"It seems to be almost a total replacement renderer," says Benjamin Smith at Stormfront Digital Pictures. "And it seems as if they've thrown stuff like the subsurface scattering and blurry reflections in for free. If the interactive preview actually works, *G2* has the potential to change everything."

G2 for PC (a Mac version will follow) retails for $499. You can read Benjamin's full review next month in *3D World*.

CONTACT: **www.worley.com**

new products

Axel Folio

MindAvenue has launched *AXELEdge 2.0*, the latest version of its critically acclaimed 3D web-authoring tool. For a taste of *AXEL*, check out version 1.0, available free on this month's cover CD. A full tutorial on using the software can be found on page 57.

www.mindavenue.com

Go With The Flow

Next Limit's computational fluid dynamics modelling software *RealFlow 2* is now – ahem – shipping. Its new features include a redesigned interface (with multiple viewports), an improved core engine, rigid body simulation system, and multithreading using up to 32CPUs. It retails at $1,195. Read our full review next month.

www.nextlimit.com

Price cut for rtre

Cubicspace has cut the cost of *rtre*, its real-time rendering system for *3ds max* and *Autodesk VIZ* to just £1,099. The move is a major boost for *rtre*, which originally retailed for £4,995, and comes in response to market demand. "*rtre* was designed to be the most advanced real-time rendering solution," explained Cubicspace CEO Steven Markham. "But we didn't expect the overwhelming interest of so many users."

www.cubicspace.com

Pixel Price is Right

Hurry and you might just save up to 75 percent on *PiXELS 3D 4.1* for Apple OS X. The product is expected to launch in the next few weeks, but until then Pixels Digital is offering the program to general pre-purchasers for $399, or 3.0 upgraders for just $199.

www.pixels.net

ART IN DEPTH

The latest incarnation of Abvent's *Art•lantis* has surfaced. *Art•lantis Render 4.5* continues the commitment to combining simple scene creation with photorealistic rendering for design professionals and architects. Raytracing, global illumination, procedural shaders, soft shadows, depth of field, and a number of other effects are all supported, while the drag and drop material and texture libraries and real-time scene previews of lighting and texture effects make it possible to generate high-quality images from existing model data in a relatively short space of time. The new version also adds tools for combining rendered elements with actual site photos, with automatic camera view matching and object integration. *Art•lantis Render 4.5* is available on Mac and Windows platforms, for £349.

CONTACT: **www.abvent.com**
www.unlimited.com

IN THE WORKS

VectorWorks 10 is the latest in the line of best-selling CAD programs (150,000 registered users in 80 countries) from Nemetschek North America. This new version focuses on fundamental drawing efficiency, with improved compatibility across other CAD/CAM formats, and a range of additions designed to enable professionals to work faster and create cleaner end results.

"In this update our users will see a product designed around their needs rather than a checklist of some new technology of the day," says Nemetschek's Chief Technology Officer Sean Flaherty. "We've listened carefully to our users' needs and have made *VectorWorks* the most productive CAD package available."

VectorWorks is available for £659.

CONTACT: **www.nemetschek.net**
www.unlimited.com

Audi, pardner!

Framestore CFC turns rodeo bull into trick pony for car ad

A bucking bronco behaves like a dexterous horse in Framestore CFC's latest ad for Audi

The modelling and animation of a fully computer-generated bull for the latest rodeo-inspired Audi Quatro ad took Framestore CFC just four weeks to complete. This CG beast appears only in the last three sequences of the advert, where, after having been subdued by its rider, it has to perform a dainty manoeuvre normally associated with a dressage competition.

Framestore CFC used the expertise it developed in making *Dinotopia* and *Walking with Beasts* to bring gravity to the CG creature, which had to match precisely the live action bull of the foregoing sequences while also seeming to dance sideways. Modelling and animation from multiple camera angles was completed using *SoftImageXSI* while compositing was done on *Henry*.

CONTACT: **www.framestore-cfc.com**

Travels through time

Mill Film creates CG biplane for General Electric

General Electric's latest ad, directed by Gerard de Thame for M&C Saatchi, used Mill Film's CG expertise to add an authentic 1930s biplane and steam train to their location filming – the train scene being shot in the Swiss Alps, the bi-plane in Jordan. The ad uses the artifice of time-lapse photography to push back shadows to reveal scenes from the history of electricity, starting with Thomas Edison's first light bulb.

3D modelling and animation of the plane and train were done in *Softimage* by senior animator Hitesh Patel and his team. Compositing work then followed using *flame*. The need to remove artefacts caused by the time-lapse photography, such as light flicker and speeded-up sky movement, added to the work load.

The production process was eased by filming the location footage with a DV camera set in tandem with the 35mm camera to mimic the time-lapse footage. By the end of the day's filming, the digital footage was available as a reference point. The commercial is currently being shown throughout Europe.

CONTACT: **www.mill.co.uk**

RUSH JOB

Veteran rockers Rush are back on the road with their first tour in five years. And, at the risk of confusing their ageing audience, they have called upon the creative services of Side Effects spin-off Derivative Inc to provide live real-time 3D visual mixes projected onto a 40-foot LED screen to accompany their stage show.

***Touch 012*, Derivative's suite of VJing tools, is designed to allow visual artists to work entirely off the cuff. *TouchDesigner* uses a procedural node-based system to model, light and texture objects in 3D. Motions and behaviours can then be matched to beats and combined on the fly in *TouchMixer*.**

Commenting on the spectacular visuals, Geddy Lee of Rush said, "I'm in love with this concept; the more the artist understands our music the more they can improvise making the show different every night".

CONTACT: **www.derivativeinc.com**

First car in space

Clear put a Megane on the moon for new Renault ad

Soho animation boutique Clear Ltd recently completed post-production work on the latest ad for the Renault Megane. The piece features the car traversing a lunar landscape with ease, a feat achieved with the use of some CG magic and a little international collaboration.

The original action was shot on location in the Californian desert. Clear's producer, Fleur Hollis, and head of 3D, John Harvey, were present on the shoot to ensure that enough data was received by the London team who were building a replacement landscape using *SoftImageXSI*.

"On the shoot we took several hundred digital stills, which were zapped back to London so that planning and design could begin. We needed to achieve a seamless blend between CG moon and live-action ground," explained John.

Clear used RealVIZ's *MatchMover Professional* software to swap the original location for a lunar landscape. Since the vast majority of the shots in the piece were taken with a moving camera, this was no small task – particularly since, according to John, "The only reference points we had were some distant mountains, which all looked the same".

MatchMover was used to process the background plates from which a camera and animation path was then derived. This information was exported to *SoftimageXSI*, where it was used to match the CG cameras with the live action footage.

The production had a truly pan-European feel. Clear had been engaged by Milan creative agency Publicis, the ad's producer was Swedish, the director was Norwegian and the client was French.

The spot aired in France on 5 October with a European roll-out to follow.

CONTACT: **www.clear.ltd.uk**

Swift 3D® is a powerful and easy-to-use application for creating dynamic vector-based 3D animations for the Web and beyond. With the ability to export complex 3D scenes to the Macromedia® Flash™ (SWF) file format, Swift 3D enables designers to generate engaging 3D content that's scalable, bandwidth friendly and viewable across multiple platforms and devices.

electric rain®

electric rain® Swift3D® V3

3 dimensional vector graphics tool

www.swift3d.com

Swift 3D V3 Features:

Modeling
- 3D Text from TrueType or PostScript fonts
- Extensive library of 3D primitives
- Bezier pen tool for creating 3D extrusions
- Lathe Editor for creating complex objects
- Texture mapping for raster rendering

Animation
- Drag-and-drop animation palette
- Full featured keyframe timeline
- Animate cameras and lighting schemes
- Non-uniform scaling of primitive objects
- Morphing of text and extrusion paths

Vector Rendering
- Render transparent materials with opacity
- Multiple overlapping shadows
- Create vector reflections
- Advanced specularity with detail controls

Imports
- 2D vector artwork from AI and EPS files
- 3D scenes and models from 3DS and DXF files

Exports
- Vector Formats: SWF, AI, EPS, SVG and SWFT
- Raster Formats: JPEG, PNG, BMP, TIFF, TGA, SWF

Raster Rendering
- Bitmap textures like wood and metal
- Procedural textures like glass and chrome
- Complex gradient and bump map textures
- Photorealistic output with reflection and refraction

SmartLayer™ Technology for Flash Integration
- Flash MX Importer streamlines workflow
- Separate fill styles and outlines
- Layered shadows, speculars, reflections & transparency
- Render stationary and moving objects to separate layers
- Combine vector animations with realistic raster images
- Insert Swift 3D renderings into Flash MX Library

• OUTLINES
• CARTOON FILL
VECTOR RENDERING
• GRADIENTS
• PHOTO REALISTIC TEXTURING
RASTER RENDERING

"Swift 3D is a fantastic tool that gives us a great deal of creative freedom and workflow efficiencies in our Flash design. It allows us to explore visual treatments that step beyond the expected, adding dimension to our creative work. This ultimately translates to us delivering a more engaging visual experience for our clients."

Todd Purgason, Creative Director - JUXT Interactive : www.juxtinteractive.com

Modeled by Mark Rush : www.rushvision.com

The Ultimate 3D tool for Macromedia® Flash™

macromedia FLASH ENABLED

THE ADIDAS BASKETBALL AD

For its latest Adidas ad, Digital Domain teamed up with David Fincher to deliver a slam-dunk of a commercial, featuring a robot in hi-tech shoes... **BY BENOIT GUERVILLE**

"To best appreciate this film, you want to see the 60-second version on a film screen," says VFX supervisor Eric Barba. "The original editing really makes the film shine, and the images just work great on the big screen."

Pre-visualisation is becoming more and more common in the industry. Compositing artist Jean-Marc Demmer explains: "This new trend is moving CG work from post-production to production proper, which is exactly how this film was made."

ON THE CD
Full-size screenshots from this walkthrough

DETAILS

Title Basketball
Production Company Anonymous Content LA
Director David Fincher
Running Time 60, 30, and 15 seconds
First Broadcast August 2002
Effects House Digital Domain
URL (of effects house) www.digitaldomain.com and www.d2.com
Team size on project 12
Time taken to complete project Eleven weeks
Software used *Maya, LightWave, ImageModeler, Nuke,* proprietary plugins

When Adidas asked renowned director David Fincher (*Panic Room, Fight Club, Seven, Alien 3*) to direct its latest commercial, the result was bound to be out of the ordinary. For the ad, which features a pair of Adidas a^3-clad robotic legs (see 'Freeze Frame', right) Fincher and Eric Barba, VFX supervisor at Digital Domain, made the decision to handle the entire job in 3D. "Any other way would have been too cumbersome," says Barba. "I wanted to give David freedom and flexibility, so 3D was the obvious choice."

With motion and rhythm essential to the movie, Fincher chose to discard the standard practice of beginning with a storyboard. Instead, he chose to treat the 3D scene as he would a real set. This uncommon approach meant that the 3D set and animation would have to be perfect from every angle. To get the shots he wanted, Fincher then played with different camera angles and leg motions, shaping the film in an organic and intuitive way.

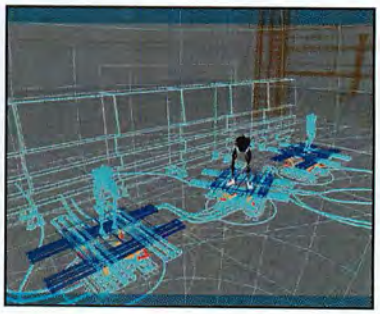
While Barba has worked with his share of directors, he was impressed with Fincher's talent: "David is brilliant to work with. He's got a precise vision and he's very quick to communicate it. He is at the same time very artistic and very technical." Team member and VFX Producer Baptiste Andrieux also commented on how uncommon it is to work with a director so knowledgeable about digital SFX and so heavily involved in every aspect of a project. Barba concludes: "[David's technical knowledge] allowed us to spend a lot more time making his vision happen. And time was needed, since we had an enormous load of work doing the animation and working on the motion capture files."

Baptiste Andrieux can be contacted at bandrie@d2.com. To see the full commercial, visit www.adidas.com.

1 The process started with shooting the motion capture data that would be used to animate the robot. VFX supervisor Eric Barba explains: "We shot for two days, using four different people: two dancers and two basketball players. They performed all kinds of moves with David [Fincher] directing them. The motion capture data was then put into *Maya* and cleaned up by the animation team."

5 At the same time, another crew was working on the set. "Instead of building a 3D environment from scratch, it was decided to start with a real set," says Barba. The set was lit and dressed according to Fincher's instructions. "It was an old aeroplane hangar, huge and industrial-looking, that was once used for testing the space shuttle. We photographed the set extensively."

9 The robot was mostly modelled in *LightWave,* using a combination of polygons and subdivision surfaces. The latter were used to control the level of subdivisions at the time of render on a shot-by-shot basis. For close-ups, the subdivisions were greatly increased, but most of the shots required a lower level of detail. The robot was then textured in the same way as the foreground sets.

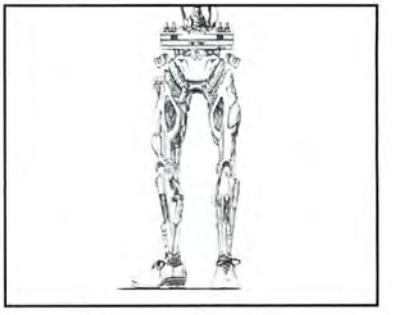


10 The original *Maya* animation set-up used during the pre-viz also needed to be transferred to *LightWave,* where all the camera work took place. "*LightWave* used to be one of our secret weapons at Digital Domain. Today it's not so secret. The rendering capabilities are very good as well as inexpensive," says Visual Effects Supervisor Eric Barba.

11 While taking pictures of the set for the photomodelling, additional shots were taken for use as HDRI maps to light the scene. These images were imported in *LightWave,* where in-house plugins helped the HDRI engine work out the lighting. "With the entire set recreated in CG and lights that were not moving inside the scene, HDRI lighting was the most efficient solution."

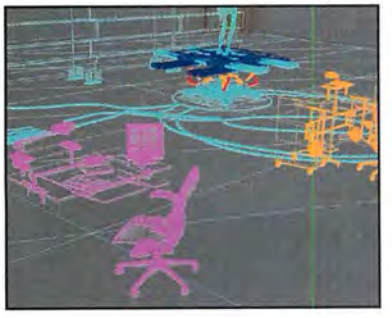
"We had two main challenges with animation. First off, it's always a lot of work to mix and match different motion files. Believable transitions must be found between one move and another. Then it all needs to be smoothed out, working on the key framing and adding little things. Second, everything had to be viewable from every angle. The animation team really outdid themselves here."

Next came pre-visualisation. "We built a mock-up mesh of the robot so that David could test the animation and decide on his camera work," says Barba. "He already had quite a few ideas but with the 3D pre-viz, something new would come up for every shot." The selected shots were then edited to see how the sequence looked, while the animators fine-tuned the robot moves.

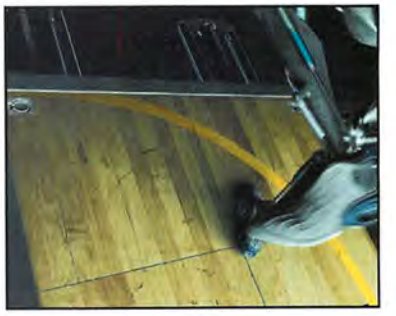


The robot design was created by Jeff Julian. Working with him, Digital Domain came up with a first series of sketches that were shown to Fincher. "David asked us to go for a more mechanical, less stylised look. So we did a second series, where everybody agreed on one very mechanical but also very stylised design that replicated the structure of real human legs."

The photos were then used to photomodel the set. "We used [RealVIZ] *ImageModeler* to reconstruct a 3D version of the real set, along with several proprietary tools to complete the job." Using reference points in the images, the software assists the CG artist in modelling basic shapes on which the photos are projected. There are no rendering hassles and the result is totally photorealistic.



"We needed more control of the foreground elements of the set such as the moving tables and the assembly line, so for these we chose traditional modelling and texturing," says Barba. The texture department recreated smooth metallic textures contrasting with the used and scratched look of the basketball court on the moving tables. "We used a lot of *LightWave* on this job."



"One of the reasons we decided to use *LightWave* as our main 3D package on this job is that *Maya* would have required the use of *mental ray* or *RenderMan*. This means writing many shaders. It's powerful but it takes time, time that we didn't have. *LightWave*'s rendering engine made it faster to get photorealistic results using photo or digitally painted textures."

"We don't work in 8-bit," explains Barba. "Our whole pipeline supports floating-point technology. It provides a much better dynamic range in terms of colour and luminance. This way, our CG images can come even closer to match the look of film. But working all this data from one package to another through this kind of pipeline always remains a big challenge."

"At one point, the fluorescent light box that covers the wall flickers. While working on his most recent film, *Panic Room*, David realised that when the camera is overcranked, there is a dephasing effect that happens between the shutter of the camera and the pulsating light of the neon tube. He asked us to replicate this effect with the CGI lighting."

"We rendered each element in *LightWave* and assembled everything in *Nuke*, our proprietary compositing software. This allowed us to finish the job inside our floating-point environment, using the HDRI maps to change the scene exposure at will in the 2D composition. Finally, the awesome sound design work done by Skywalker Sound added the finishing touch."

FREEZE FRAME

In a dark factory, pairs of robotic legs are lowered down on work tables made of tiles that look like the floor of a basketball court. The middle pair of legs are wearing Adidas a³ shoes. As the tiles begin to shift positions like pieces from a constantly moving puzzle, the robot executes a range of fancy footwork. Another robot springs to life, this one not wearing a³ shoes. Both robots jump up and collide in mid-air. But only one stays upright on landing. Can you guess which it is?

VIEWPOINT

Shelley Page

TITLE EUROPEAN REPRESENTATIVE
COMPANY DREAMWORKS SKG
WEB WWW.DREAMWORKS.COM

Shelley Page returns from Digital Arts World and the 3D Festival/LEAF conference to ask: which will be the next studio to enter the big league and start making full-length CG movies?

Three event-packed days at Digital Arts World this month left me with an overwhelming amount of new information on the visual effects and animation industry to process. Many cups of really strong tea later, some clear impressions began to emerge. In the Feature Animation sector I inhabit, both the established studios and the newer contenders are finding their individual voices; *Shrek* has firmly set the PDI/DreamWorks tone as witty and irreverent, *Lilo & Stitch* shows Disney returning to its roots in warm emotional stories and Pixar continues to delight with wonderful technique and humour pitched at younger audiences, but with great crossover appeal. And with *Ice Age* Blue Sky Studios has found a new niche for a more cartoony style of storytelling, which at its best harks back to the heights of Tex Avery and Chuck Jones.

Meanwhile, rumours of ambitious UK-based CG features circulate. Something all-conquering USA-based CG feature studios have in common is years of R&D plus animation and story skills honed on commercials, short films, or visual effects. This puts start-up studios at a disadvantage and is one reason that I, for one, am watching the UK scene with great interest.

One obvious UK success story is Aardman Animations' transition into a fully-fledged feature studio with *Chicken Run*. With three new features in the pipeline, including the Wallace & Gromit movie *The Great Vegetable Plot*, Aardman has established itself as a major player. So who will be next? Jim Henson's Creature Shop fits the profile – years of experience, proprietary tools with an R&D team behind it and strong character animators.

Framestore CFC could be another candidate – *Dinotopia* proved it can produce high-quality character animation as well as photorealistic dinosaurs. Commercials for Xbox and Levis plus visual effects on numerous movies, including the upcoming *James Bond: Die Another Day* have established Framestore CFC in the front rank internationally.

Passion Pictures, although smaller, also has the background in character animation to make the move into features. The Gorillaz videos have the kind of unique style that opens the way for further development. Hopefully, one or more feature projects will get greenlit in the UK soon, bringing possibilities for growth in the industry – especially for new recruits. It's not easy for a beginner to get that vital first foot on the ladder.

Big projects bring opportunities for new talent and enable established artists to reach new heights. During a panel discussion at the show, we highlighted some key issues facing a studio gearing up for production on a feature project. The first and last element is a great story – without which there is no point is going any further – but assuming that is already in place, the next step is to take a long hard look at available talent and resources. The UK has a well-deserved reputation for producing great animators – at PDI/DreamWorks we have the brilliant James Baxter, among many others – but we don't have the same experience as the USA in developing CG character animators. Schools can assist here, particularly if we eventually see more traditional animators teaching digital animation students. Let's hope they get their big breaks! ■

Which will be the next UK studio to make a full-length CG movie? As European Representative of DreamWorks SKG, Shelley Page is well placed to be a tipster...

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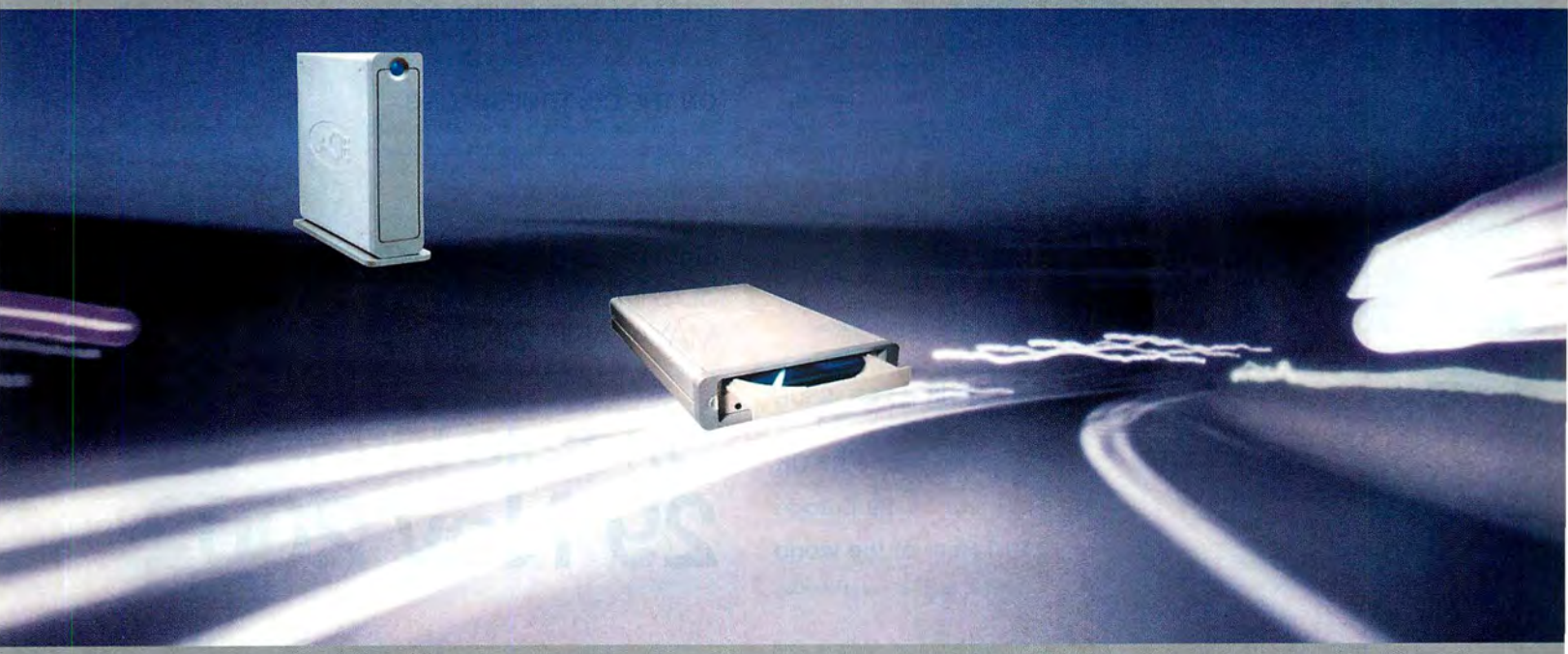

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FEATURE #023

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LOOK TO THE FUTURE

OUR STATE OF THE INDUSTRY REPORT

In today's ever more competitive entertainment industry, only the well-informed will survive. Our market research has identified the questions that will shape your future as a 3D artist. And over the next eight pages, our panel of experts supplies the answers **BY MARK RAMSHAW**

During the inaugural party for the recent Digital Arts World show (see page 10 for more details), *3D World* helped to organise some market research. The first annual Digital Arts survey revealed what was on the minds of the 3D industry: the challenges facing artists, the way the market was changing, and the things they expected to become big in future. And the results got us thinking.

With application prices tumbling, smaller studios taking a more prominent role in movie effects production, and CG movies enjoying unprecedented success at the box office, the industry is changing faster than ever before. Now, more than ever, it is essential for 3D artists to take stock of current trends if they are to survive into the future. And, more than ever, it is essential to be aware of certain vital questions.

These, then, are the answers to those questions. Over the next seven pages we speak to leading figures from the front line, at facilities such as Mill 3D, The Moving Picture Company, Aardman Animations, and Fragile Films. And we also look at hard data relating to each topic. Using statistics supplied to us by both TrendWatch and Robi Roncarelli at Pixelnews, two of the industry's most respected data sources, these facts and figures lay bare the industry – from the market shares of the various software applications to the global distribution of revenue, and much more.

Unsurprisingly, there are some conflicting views on offer here, but then the future is never certain, particularly in the ever-volatile field of computer graphics. It will be interesting to see just how much has changed by the time Digital Arts World 2003 rolls around.

>>

Will one package prevail?

The battle between the leading 3D applications is fiercer than ever. But could there ever be a victor in such a diverse and interdependent environment? And how would the visual effects industry respond?

VITAL STATISTICS

>> **Usage frequencies of major 3D apps in professional studios (descending order of popularity)**

MAYA
3DS MAX
LIGHTWAVE
SOFTIMAGE|3D **[1]**

>> **63% of US visual effects studios said they own *Maya*. 38% said they own *3ds max* [2]**

>> **Alias|Wavefront: Approximately 40,000 licences issued by 2000, with around 60% used for animation [3]**

>> **Softimage: Approximately 40,000 licenses issued by 2000, with around 80% used for animation [4]**

SOURCES

[1]TrendWatch

[2] TrendWatch Visual Effects/ Dynamic Media Report (Mar 02)

[3] 2000 Roncarelli Report on the Computer Animation Industry

[4] 2001 Roncarelli Report on the Computer Animation Industry

Artists working in digital fields such as desktop publishing, graphic design, and Web design have seen a single applications take a dominant role in each area. *Photoshop* is the *de facto* standard for paint work, for example, while *Quark XPress* is the tool of choice for print design and *Dreamweaver* is (arguably) the tool of choice for Web designers. This contrasts wildly with the 3D industry. Ever since Alias, Wavefront, Softimage, NewTek,and Autodesk took their first steps into the 3D software market, there's been a constant push and pull. With the vendor war escalating and prices crashing, could we finally see one single application or developer take complete control of the market?

MARKET FORCES AND COMPLACENCY

"I certainly hope not!" says Bruce Steele, Director Of Visual Effects at Glassworks. "As one software company starts to become the industry standard, it becomes more arrogant and less responsive to its clients' needs."

Steele believes that this then opens a gap in the market for a new product to emerge and assume dominance. "The new kid on the block then begins to think that it, too, is infallible and so stops listening to complaints, and the cycle starts again. With at least two main players, the pressure to keep up with the competition tends to counteract complacency, at least to some degree."

"It's healthy to have competition," adds Jim Radford, head of 3D at Moving Picture Company. " And you just have to look at tracking software to see how quickly a market can change. There are so many tracking packages now, each capable of solving slightly different problems. Besides, if you get the point where a package is cheap enough, then you'll buy it – whether or not it's going to be your main 3D tool."

STEPHEN VENNING
OPERATIONS MANAGER, MILL 3D

"I think one of the driving forces behind current CG has to be to increasing power of the software, and this itself is being driven by competition between vendors."

JIM RADFORD MOVING PICTURE COMPANY

"I don't think we'll see one ruling package, and nor should there be. Just imagine if we all had to use the same application!"

PAUL FRANKLIN DOUBLE NEGATIVE

"A company like Alias|Wavefront is huge, and so responds to market research rather than individual requests for features. It can never cater for everyone's needs."

THE HOLY GRAIL

But even if there isn't a *de facto* 3D application, is there still a dominant one? Paul Franklin, head of CG at Double Negative, believes that the *Maya*/*RenderMan* combination fits the bill. "Obviously, there are also *XSI*, *Houdini*, and *mental ray*, but they supplement rather than completely replace. Because *Maya* dominates, artists educate themselves using it, and it becomes a self-perpetuating situation. Undoubtedly, someone will eventually come along with a new package or a newer version of an existing one that's better than the market leader, and that will change the market."

"This is the one 'holy grail' of the industry," says Michael Carter, Aardman's head of CG. But he argues that the desire of Alias|Wavefront, Softimage et al to provide applications that cater for all needs is what causes the problems in the first place. "They lose sight of their core competency, unlike Pixar with *RenderMan*. Pixar developed a solid tool right from the beginning, adding additional features primarily according to its own needs. The key element is that the underlying core was never abandoned and has continued to be built upon."

"All the major 3D applications have their own strengths and weaknesses," concludes Carter. "Ultimately, part of the appeal and challenge to us as users, is to unify them into one 'meta application', to suit our own production strengths."

INDUSTRY VERDICT Yes No

Can cheaper tools survive?

With high-end packages like Maya and XSI now priced within the reach of the wealthy amateur or semi-professional, what future do the traditionally lower-priced 3D applications have? Will users continue to buy them?

Only a year ago there were two clearly defined tiers in the 3D software marketplace. The product and licence costs for packages like Alias|Wavefront's *Maya* and *XSI* from Softimage – and even Newtek's *LightWave* and Discreet's *3ds max* – placed them out of reach of all but industry professionals. The hobbyist or semi-professional would turn to low-cost, less impressively specced packages such as *Carrara*, *Hash Animation:Master*, and Caligari's *trueSpace*.

Now that the prices have tumbled at the higher end of the market, budget-conscious artists at last have the opportunity to get their hands on the industry-standard applications. But where, if anywhere, does that leave the semi-professional packages? Could this spell the end for these lower-cost alternatives? Or do the prices of extra licences, plugins – and all those other extras that make life worth living for the users of high-end software – still provide enough of a gap for the lower tier to flourish?

SOFTWARE EVOLUTION

"I think there'll always be a place for this sort of software," says Jim Radford at Moving Picture Company. "You can't stop people from wanting to create new software, and so we'll always have authors creating these sort of applications.

Radford believes that by adjusting to compete again on price and continually improving performance, the likes of *Carrara* will continue to flourish. "Besides, if they did stop then the whole evolutionary process would grind to a halt. You need these lower end packages to keep those at the top end of the market on their toes."

STEPHEN VENNING MILL 3D

"I make no differentiation between software based on cost: it's all about what it can do."

DAVE LEVY MILL 3D

"It's all about marketing and the killer feature at the end of the day. Any one package could become King tomorrow. Nothing is static."

MICHAEL CARTER

HEAD OF CG, AARDMAN

"Taking into account the fact that *3ds max* hasn't been able to [gain critical mass in the film industry], I don't see a new 'heavyweight' contender emerging from the current semi-pro applications."

VITAL STATISTICS

>> **50% of effects studios and 56% of animation studios plan to invest in new software, mostly in the $5,000 to $10,000 per licence price range. [1]**

>> **Company ranking by total software licences sold:**

Caligari
Discreet
Strata Inc.
NewTek
MetaCreations
Maxon
Hash Inc.
Alias|Wavefront
Softimage
Realsoft
Electric Image Inc.
Cambridge Animation Systems
AXA Corporation
Side Effects
Linker Systems
ToonBoom/US Animation
Crater Software
MEDIAPEGS
Engineering Animation [2]

SOURCES

[1] TrendWatch Visual Effects/ Dynamic Media Report (Mar 02)

[2] 2001 Roncarelli Report on the Computer Animation Industry

400-POUND GORILLAS

But over at Aardman, head of CG Michael Carter isn't convinced that low-end packages can ever evolve sufficiently to give the leading applications any real cause for concern, citing the fate of Improv Technologies' *Orchestrate3D*. "It proved that smaller companies could develop pioneering technology, but also that they can quickly become victim to the 400lb gorillas of the software industry. Instead, I look at cases like Joe Alter, Liquid, and Animal Logic, which fill in the gaps left by the feuding market leaders, as the real inspiration and future of the industry."

Bruce Steele at Glassworks agrees with Carter, suggesting that the inertia of the market ultimately prevents the low-end packages from having much impact.

"There are really only two competitors: *Maya* and *XSI*. The rest are largely irrelevant, as the investment in operator skills and licensing costs preclude rapid changes for any sizable company. The initial cost of a seat of *XSI* or *Maya* is much less than we charge for a week of 3D animation, so the price per seat is also largely irrelevant. The real cost is in equipping the whole studio; this includes multiple rendering licences along with the investment in skills and knowledge needed to make it deliver on a job. This means there is no good time to completely change your core software. It's a case of better the devil you know."

INDUSTRY VERDICT Maybe >>

Will games and film converge?

They told us the film and video games industries would one day collide. But it hasn't happened yet. The two areas are more closely linked than ever, so why don't we have video games from Pixar or movies from EA?

VITAL STATISTICS

>> 18% of effects studios work on design, creative, and production for games. 27% create computer animation for games. 9% do post-production for games. Fewer animation studios work on games projects than visual effects studios. [1]

>> Estimated global revenue for videogames in 2002: $20 billion.

>> Estimated global revenue for digital animation in 2002: $29 billion.

SOURCES

[1] TrendWatch Visual Effects/ Dynamic Media Report (Mar 02)

With console technology developing at such a phenomenal rate, there's no longer such a gulf between the skillsets required to develop real-time 3D content for video games and those used in the post-production industries. Artists and animators migrate between the two sectors, and both *XSI* and *Maya* are now widely used by games developers. Content sharing between a movie CG team and a game 3D team is now a real possibility, so what's stopping the studios?

There's a simple answer. "Convergence is like the paperless office: it is an over-hyped term invented by marketing men and the press," says Bruce Steele at Glassworks. "Companies specialise: that's what makes a studio like Pixar so good."

FUTILE FANTASY

But what of Square's attempt to bridge the gap, creating a movie spin-off from its *Final Fantasy* games? "The mistake was to think that everyone wants to see photorealistic characters based on a videogame," says Steele. "Even if the animation is so good you can't tell it's not real, why bother if it's quicker, cheaper, and more interesting to shoot real people?"

"Entertainment convergence is a dream," agrees Michael Carter at Aardman. "No matter what type of animation is engaged, the core skill set should have a traditional template; acting, life drawing, modelling, staging, lighting and so on. Divergence occurs with the various mediums – broadcast, games, film, and Web – but a certain technical and artistic specialisation is needed to understand each industry."

Bruce McMillan, Executive Vice President, Worldwide Studios of Electronic Arts, has his own take on convergence.

BRUCE MCMILLAN

EXECUTIVE VICE PRESIDENT, ELECTRONIC ARTS

"Movie people want to get closer to video games because they are blown away by the demographics. Today, games, not movies, are the dominant cultural force in the lives of many young people."

BRUCE MCMILLAN ELECTRONIC ARTS

"You shouldn't expect a film company to make good games any more than you would expect an author to be a great director. A lot of companies, such as Disney, have made that mistake."

MICHAEL CARTER AARDMAN

"I can't see Aardman ever getting into game production. [For us] the technical requirements far outweigh the benefits of entering the market."

"It's is one of the biggest dynamics in both industries right now. Witness the number of games that have become movies, such as *Tomb Raider* and *Resident Evil*, the number of movies that look like games, and the number of games that are launching jointly with the movies, including *Harry Potter, James Bond* and *Lord of the Rings*."

That's not to say he believes in the notion of convergence within the walls of one studio. "Lots of major movie studios have tried to make games, but few have succeeded. There's the trap of thinking that games are just like movies, and that a company with a great intellectual property can simply code this into a game. They're completely different art forms."

McMillan also stresses that EA has no interest in creating linear entertainment. "We think that interactive entertainment is a higher, more deeply evolved form of art and entertainment. Linear entertainment like film may have dominated the 20th century, but the future is interactive."

LucasArts is world-renowned for its videogame spin-offs of the *Star Wars* movies, but even here the two divisions are run as separate entities, and the games are often coded by third-party development teams. At best the crossover is limited to the game teams re-using a few sound effects and textures. Even in the land of Lucas, it seems that convergence only has a place in the marketing department.

INDUSTRY VERDICT Yes **No**

Can the UK make CG movies?

The announcement of a dedicated animation facility at Ealing promises to bring CG movie making to the UK, but can the industry ever create its own Toy Story? And, more to the point, will it ever be able to fund it?

Time and again over the last few years the UK has proven itself more than a match for the American post-production facilities. But what about the quickly expanding CG animated feature market? Could the UK's talent pool be harnessed for the creation of an entire movie?

"Yes, definitely," says Mike Turoff, a veteran visual effects producer currently working with Henson's Creature Shop. "It's just a matter of time, but we may have to be patient."

Turoff believes that the UK doesn't quite yet have the army of talent necessary to make a CG feature. "You've got hundreds of people graduating every year, though, so the talent base is building, and at the same time tools are improving so less people are needed for this kind of project. And though there's a lack of funds holding it back, the costs involved with a CG movie are coming down."

Bruce Steele at Glassworks isn't convinced. "What UK movie industry? We certainly have some of the best technical people in traditional film and effects, but the money for that comes largely from the USA. If you had $5 million to spend on CGI would you go somewhere with a track record of handling that sort of budget or take a risk by using a smaller company?"

MONEY FROM THE STATES

"At the moment, there are very few studios outside of Los Angeles with the clout or power to fund a movie and then come up with the money to promote, package, and distribute it," concedes Turoff. "If you're dealing with a budget of $50 to $100 million, for now the money has to come from LA, and so the movie is naturally more likely to be developed over there. But if it gets to the point where a CG feature can be made for $20, $15, or even eventually straight to video for $5 million, then it will happen in the UK."

PICTURE COURTESY OF: Jillian Edelstein

BARNABY THOMPSON
PARTNER, FRAGILE FILMS

"Given that the cost is reducing all the time, I believe it's definitely possible to make CG films out of the UK, as we're doing with *Valiant*. The key will always be to find compelling stories."

VITAL STATISTICS

>> 63.9% of computer animation production facilities make less than $1 million a year. Less than 1% make more than $15 million. [1]

>> In 2000, North America held a 48.8% market share of the computer animation industry, up from 46.9% a year previously. UK/Europe held 22% and Asia 29.2%. [2]

>> Average production output for systems in 2000: $70,000. This shows a steady rise since 1996 (just over $40,000). [3]

>> Approximate market distribution figures for 2000

ALIAS|WAVEFRONT: 50% USA, 25% UK/Europe, 25% Asia

SOFTIMAGE: Evenly split between the three territories

DISCREET'S 3DS MAX: 50% USA, 25% UK/Europe, 25% Asia

NEWTEK: Approx 55% USA, 15% Europe, 30% Asia. [4]

SOURCES

[1,2] 2001 Roncarelli Report on the Computer Animation Industry

[3,4] 2000 Roncarelli Report on the Computer Animation Industry

PUTTING THE CART BEFORE THE HORSE

"This has to be idea-led," says Stephen Venning at Mill 3D. "Yes, we undoubtedly have the talent, but we can't make a full CG movie for the sake of making a CG movie."

Michael Carter at Aardman agrees. "In terms of artistic and technical talent, the UK and London in particular is recognised as one of the major areas of CGI production worldwide, so do we really need to produce a full CGI movie to say we succeed in the industry?" Carter also believes there's a lack of skilled animators in the UK. "That's not to say it couldn't be done, but it would leave most of the remaining studios extremely short of staff. And like Japan, the UK suffers from suppliers who normally make studios pay double what the US and Canada pay for kit. Finally, there's the operational talent; studio managers, producers and so on. These skills are available in the UK, but why reinvent the wheel? We would need to bring in experienced outside talent to help skirt the pitfalls we might otherwise fail to recognise."

"Even in the States there aren't many companies who have done it yet, and there have only been a few projects created outside Disney and Pixar," points out Jim Radford at The Moving Picture Company. "It will be very interesting to see how things go down at the new Ealing studio."

INDUSTRY VERDICT Yes [illegible] >>

JIM RADFORD MOVING PICTURE

"At the moment, I'm sure we'd be able to handle it artistically and technically. The problems lie with funding and trust."

MIKE TUROFF HENSON'S CREATURE SHOP

"Eventually, the two curves, available funds and cost, will intersect, and it will happen. Then, if that first movie does well, you can be sure we'll see more such projects."

Will CG kill trad animation?

With computer-generated animation currently hogging the box-office spotlight, where does this leave more traditionally animated movies? Is there still a place for them in the modern cinema-goer's affections?

VITAL STATISTICS

>> Box office performance of most popular recent CG movies

SHREK
$250 million

TOY STORY 2
$246 million

MONSTERS INC.
$205 million

DINOSAUR
$138 million

ANTZ
$91 million

>> Box office performance of traditionally animated movies

LILO & STITCH
$144 million

CHICKEN RUN
$103 million

THE PRINCE OF EGYPT
$101 million

RUGRATS IN PARIS
$74 million

FANTASIA 2000
$59 million

SOURCES

All figures show box office gross to date (rounded to nearest $1 million) and are taken from www.boxofficemojo.com

Every CG movie made seems to enjoy more commercial success than the last, while traditionally animated films fail to make the grade at the box office. Cinemagoers, and therefore movie studios, love computer animation. But where does that leave the classically animated movies? Is there really a future for cel animation, or, for that matter, stop-motion animation, claymation, and other traditional forms? Or is CG set to take over the industry?

"It might be possible," says Mike Kirwin at Box. "At the moment the box office smashes are all 3D CG. And even *Final Fantasy* did okay in terms of turnover, if not profit. But these things do tend to go in waves and cycles."

WHAT'S THE STORY?

"Digital is very convenient, bringing costs down and allowing for more creative flexibility," concedes Mike Turoff from Henson's Creature Shop. "But while traditionally animated cartoons or stop-motion movies like *Chicken Run* may not be at the centre of the spotlight or get the biggest budgets in the future, I do think there's still a place for them. Ultimately, it's the story that counts. The style used to tell the tale is secondary to that."

Story may always come first (and indeed the premier CG studios such as Pixar clearly recognise this), but this is an industry governed by profits, and right now the revenue-to-costs ratio for computer generated animations far outstrips that of cel-animated productions.

"There has been a lack of successful blockbuster cartoons using traditional animation recently, so I suppose the big money might push more towards CG animation right now," says Turoff. "But my feeling is that CG tools are still pretty crude. We wrestle every day. It still requires an awful lot of labour to get these CG characters to perform well."

MIKE KIRWIN BOX

"While cel animation has been around for a long time, CG still seems like such a new and vibrant format. Every single time you work with CG animation you've got a blank piece of paper."

STEPHEN VENNING MILL 3D

"Fashion dictates when looks are in or not, but animation will stand or fall depending on its quality and not how it's made."

But if CG is so flexible, will it not eventually become more cost-effective to create all animation digitally, rendering using techniques that emulate these traditional styles? "It's not impossible, but whether it's worth it is another matter," says Mike Kirwin. "There's a uniqueness you get when working with clay, stop-frame, puppets, and cel animation that provides such huge scope."

"I don't even like to differentiate between the styles," says Stephen Venning at Mill 3D. "Personally, I hope we always see traditional animation. I certainly never dissuade anyone from going that route if I felt they'd get better results."

BRUCE STEELE
DIRECTOR OF VISUAL EFFECTS, GLASSWORKS

"Traditional animation is not dead. Just look at Aardman, which has had more success with claymation movies in the UK than any CG animation company."

STICKMATION

Over at Aardman, Michael Carter also subscribes to the 'story is king' principle. "It sounds like a mantra, but CGI is just another technique in the traditional animation process. Whether it's on paper, in clay, or digital, the same techniques are needed to convey a story, maintain an audience, and bring characters to life."

Carter foresees a time when all the styles and techniques are used seamlessly alongside one another, building on the hybrid work of productions such as *Iron Giant* and *Spirit*. "In the end, if the story is well written, we could animate with sticks and it would still draw the audience in."

INDUSTRY VERDICT Yes **No** Maybe

Do we still look up to ILM?

From one groundbreaking effects movie after another, George Lucas' Industrial Light and Magic was once undisputed world leader in the field of CG. But is this still the case, or are there newer contenders?

When the entertainment industry first picked up on the commercial possibilities of CG effects, there were few studios to deliver what was needed. By the time ILM came to prominence in the mid-eighties, almost all the major entertainment-based CG outfits of the seventies had disappeared. The team assembled by Lucas had little in the way of competition and a lot in the way of talent. From *The Abyss*, on through *T2: Judgment Day*, and *Jurassic Park*, the studio turned out one milestone project after another. With dozens of studios now competing for movie effects work contracts, which, if any, now leads the way?

"There's no one leader", reckons Dave Levy, Mill 3D Technical Director. "Most studios can handle 90% of shots. Those with half decent R&D can handle the other ten. It depends on the will of the management as to how much they will spend on going that last ten yards, and the skill of the sales team in convincing the studio you can do it – for which track record does naturally help."

STIFLED CREATIVITY

"We really have to look at each studio based on the core ability and the field in which they've chosen to excel," argues Michael Carter at Aardman. "Aardman, for instance, would never do VFX, as this isn't our core ability. Character animation is, and that's what we strive for."

"I'd still say that although there are a lot of cool companies around the world, ourselves hopefully included, ILM is still generally out in front," counters Paul Franklin at Double Negative. "ILM's track record, the relationships that they have with the world's best filmmakers and studios, plus the sheer size of the place – with more than a thousand employees covering all aspects of the VFX process – all give it a major advantage over other outfits. Outside of ILM there's definitely a much leveller playing field, with no clear frontrunner."

"ILM is still the leader, but that's because it takes a bit of time to dislodge them," says Jim Radford at Moving Picture Company. "It's no longer the case that they're so far ahead visually, or that every year they come out with something nobody has seen before."

Radford believes this may be due, in part, to the way the studio now runs many projects concurrently (currently twelve), rather than focusing on one major movie at a time. "There must be a point where you stretch too thinly."

"Huge companies like ILM necessarily turn into factories, where much of the talent goes to waste in an effort to quantify the production line," adds Bruce Steele at Glassworks. "Regular software upgrades are not so practical in such a huge set-up, so the majority of ILM staff, for example, will be working with much less up-to-date software than many smaller companies." Steele does believe ILM remains the brand leader for effects, though, while companies like Pixar excel when bringing characters to life.

Barnaby Thompson, partner of Fragile Films and co-producer of upcoming CG movie *Valiant*, agrees. "There are so many great outfits, but for animation I would have to say that Pixar probably has the edge right now. Of course, all that can change: it's a very exciting time."

JIM RADFORD
DIRECTOR OF VISUAL EFFECTS, MPC

"I think there's been a catch-up with ILM in terms of expertise from all the other companies. We're seeing work of a similar quality created elsewhere now."

VITAL STATISTICS

>> ILM
Approximately 1,100-1,300 staff, 12 movie projects currently in production, winner of 20 Academy Awards (14 for Best Visual Effects and 6 Technical Achievement Awards), has three times more workstations than the nearest competitor.

>> PIXAR
Approximately 650 staff, three full CG movie projects currently in production. Winner of 14 Academy Awards (3 Best Short Film Awards, 7 Scientific & Engineering Awards, 1 Special Achievement Award, 2 Technical Achievement Awards, 1 Award Of Merit), revenue for last year was $91.2 million. $1.5 billion box office sales since 1995.

>> DREAMWORKS/PDI
Approximately 350 staff, 1 full CG movie project currently in production, 1 Academy Award (for Best Animated Feature).

PAUL FRANKLIN DOUBLE NEGATIVE

"There have been pretenders to ILM's crown, but ultimately none of them has been able to exhibit the staying power and consistency of Mr Lucas's company."

MIKE KIRWIN BOX

"I think it's now more a battle between Disney and Pixar on one side, Dreamworks and its PDI division on the other."

INDUSTRY VERDICT Maybe >>

OPINION
TRADITIONAL ANIMATION VS CG

It's not a phase, but CG isn't a replacement for traditional animation, either. Perhaps it's just one genre among many

Which way next?

You've heard the statements and seen the evidence. So what shape *will* the industry be in two years from now?

One thing everyone we spoke to clearly agrees on is that its vital to have two or more 3D applications vying for market share. This makes *Maya's* rise to prominence over the last two years seem all the more singular. In part this can be attributed to the support for Microsoft's Windows NT platform and the natural leapfrogging over rival packages that occurs every time a new version of a 3D product is released. But in that time Softimage has hardly been idle at releasing new code. Without doubt, its software continues to address areas and appeal to users that Alias|Wavefront's doesn't, but more work is needed to redress the balance.

As for the worry that the greatly reduced retail price difference between the likes of *Maya* and *XSI* and lower-end packages may drive the smaller players out of business, our panel does seem confident that the semi-pro packages will continue to flourish (even if they don't all agree on how much impact this has on the high end of the market).

THE TIMES ARE A CHANGIN'

It's also worth noting that there are several variables to account for when comparing prices. "Even with the recent price changes, once all the plugins are added, the price [for a professional package] is still in the $10K/seat range," points out Jim Whittington of TrendWatch.

Convergence? Little dispute there. Whatever the increasing number of similarities between videogames and movie effects, the two remain very different disciplines. Furthermore, movies and videogames are essentially chasing the same disposable income. For the games market, movies simply provide a marketing angle, a way to bring titles to attention of the masses. Bruce McMillan at Electronic Arts makes the rivalry clear when he says, "We like to say that deep down, everyone in Hollywood knows that games are cooler than movies, and if they ever forget, their kids are more than happy to remind them."

Regarding the rather less serious issue of whether there's still a dominant digital studio, ILM still just about ranks as the industry favourite. It's not too surprising that Pixar finds favour with many, though with the studio committed solely to 3D cartoon animation, it's never really possible to compare the two that closely. Perhaps more interesting, though still lower in profile, is DreamWorks/PDI, which continues to balance movie and effects work with its animated feature projects. It'll be interesting to see whether Blue Sky focuses solely on film work in future, or also chooses to divide its resources between these areas.

As for the likelihood of a UK challenger to Pixar: again, there's some disagreement. Yet just seven years and a handful of films in, with the CG film industry still in its infancy, films like *Jimmy Neutron* have already shown that a movie can be developed on a small budget. If the *Valiant project at Ealing* is a success, and CG movie budgets continue to decrease, it can surely only be a matter of time.

For more speculation about the future of 3D, check out our interview with TrendWatch founder Jim Whittington on page 98, or read Shelley Page's Viewpoint column on page 20.

It's perhaps surprising that those in the 3D industry should be so positive about traditional animation, since trad animation is essentially a range of rival formats. But then the digital artists and animators have generally grown up with non-digital animation, and fully understand the need for a grounding in traditional skills. They don't perceive traditionally animated movies as competition, simply as a different way of telling the story.

What's more, films such as *Monsters Inc.* and *Ice Age* arguably rely as much on the classic tricks of the trade as they do on computer graphical talent. As Glassworks' Bruce Steele says, "John Lasseter at Pixar has shown that we have much to learn from traditional animation, and in doing so he has raised the level of CG character animation throughout the world."

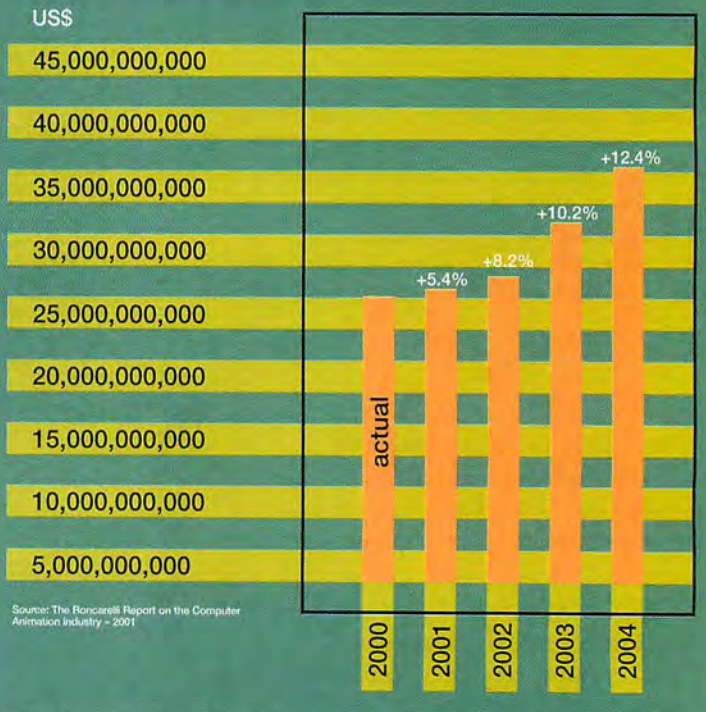
And while the box office figures for 3D animated movies are currently outstripping those of more familiar two-dimensional cartoon features with ease, it's vital to appreciate just how few all-CG features there *have* been so far. There's still no telling whether audiences will tire of computer-generated graphical styles, or indeed how divergent rendered styles may yet become.

The success of both *Chicken Run* and Disney's latest venture *Lilo & Stitch* indicates that there is still a demand for animated films with a non-CG approach. And Michael Carter at Aardman is almost certainly correct when he suggests movies like *Iron Giant* point the way forwards, using CG for the elements that are best handled digitally, and sticking with hand-animation for those elements that aren't.

Forget the movie/videogame crossover – it's between CG and trad animation that true convergence is most likely to take place.

STATE OF THE INDUSTRY

The rise and rise of CG, as depicted in a five-year industry revenue forecast produced as part of the Roncarelli Report



Source: The Roncarelli Report on the Computer Animation Industry – 2001

ANALYSIS: The transition from 2001 into 2002 saw a slow economy, which had its effect on the general computer animation industry as much as any other field of economic endeavour. But in actual fact, while less vigorous than previously expected, the computer animation industry remains one of the consistently top performing industries of all.

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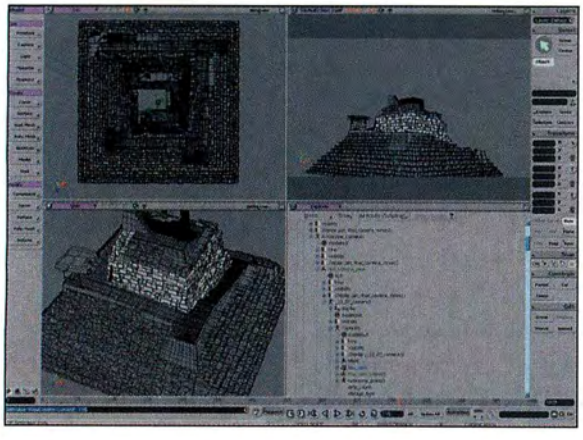
FEATURE

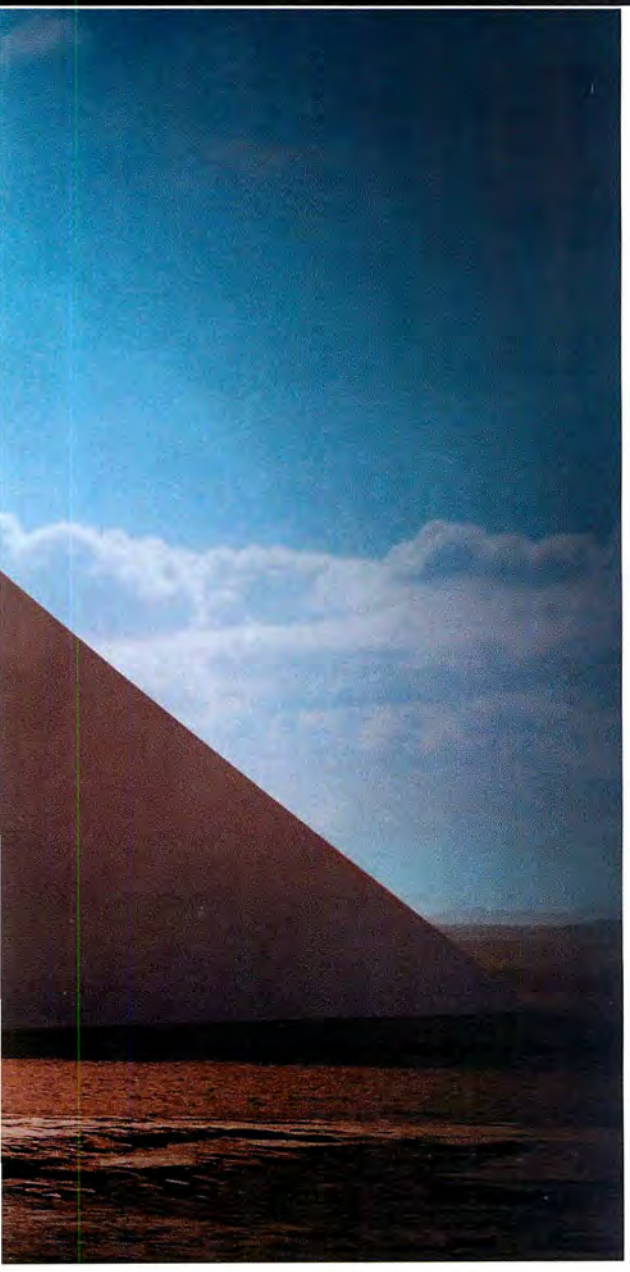


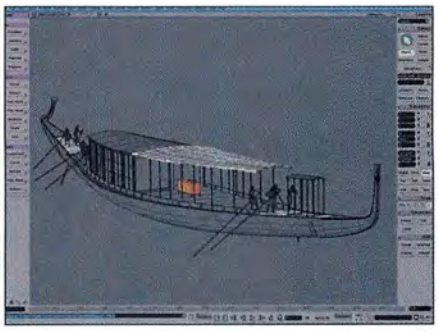
THE ORIGINAL PYRAMID SCHEME

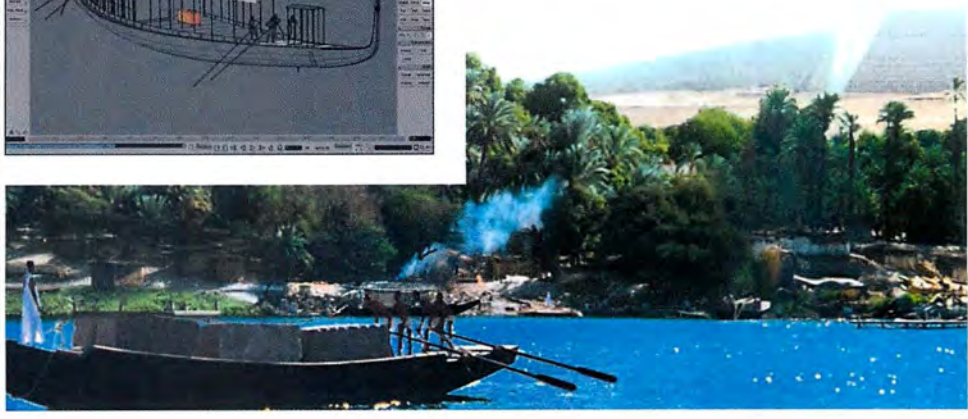
Shrouded in mystery for over 4,000 years, the construction of the Great Pyramid of Giza is explored in a new production by the BBC and Mill TV. *3D World* went to find out how the team overcame the unique challenges posed by this exciting project

BY BEN VOST

#033







"I HAD EVERY CONFIDENCE IN THE MILL'S WORK BECAUSE OF ITS TRACK RECORD WITH THINGS LIKE GLADIATOR. BUT I WAS STILL SURPRISED AND ASTONISHED BY THE RESULTS THE TEAM ACHIEVED." Jonathan Stamp, DIRECTOR

When you consider that the Great Pyramid of Giza, the cyclopean burial place of King Khufu and the last remaining Ancient Wonder of the World was such a major achievement in mankind's history, it's no surprise that many theories have been put forward over the years to explain away its creation as an alien artefact, or at least made with alien technology. It's hard to conceive just how the scale of the enterprise could be purely human, even when you consider the fact that the construction would have taken more than 23 years to complete.

These questions set the scene for an hour-long, one-off documentary screened on BBC1 at the end of October this year – called, simply, *Pyramid*. The whole project was set in motion last spring with discussions between Jonathan Stamp, the director and creator of the documentary, and Dave Throssell, head of Mill TV. Stamp had been inspired by *Walking with Dinosaurs* and Framestore CFC's recreation of prehistoric life, and wanted to take on a project that would achieve a similar level of interest using the latest tools. It didn't take long to discover an appropriate subject. Viewer research conducted at the BBC showed that the pyramids were the most interesting history topic to audiences, and out of the hundred or so discovered in Egypt to date there was really only one choice for Stamp: the Great Pyramid of Giza.

"The philosophy behind the whole thing was to make the viewer feel as though he's there, on the Giza plateau, something we could achieve with computers," Stamp says. Stamp had seen Mill Film's Oscar-winning work on the film *Gladiator*, so he knew that it was at least worth talking to the company. Fortunately, in Throssell, he found a ready ear.

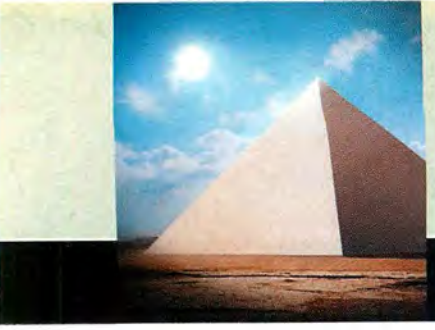
"Dave and I shared the same kind of philosophy and enthusiasm for the subject matter and I knew we'd found the perfect match," explains Stamp. Although superficially similar to *Gladiator* (two of the people who crafted the effects for that film were consultants on this project – namely Laurent Huguenot and David Lomax) the two projects were extremely different. The tools used to create the effects have moved on in the five years between the making of *Gladiator* and this project; the size is different – broadcast television instead of film-resolution work; and obviously, the budget is >>

MAIN IMAGE **Until the creation of the Eiffel tower in 1899, no man-made object stood taller than the great pyramid at Giza**

FAR LEFT **To achieve maximum believability, the pyramid had to be extremely accurate inside and out**

ABOVE **Here you can see the *Softimage* pyramid taking shape in the distance**

ABOVE INSERT ***The*** **production team made one replica boat for real; the rest were CG**



FACT FILE

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Mill TV

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40-41 Great Marlborough St, London W1

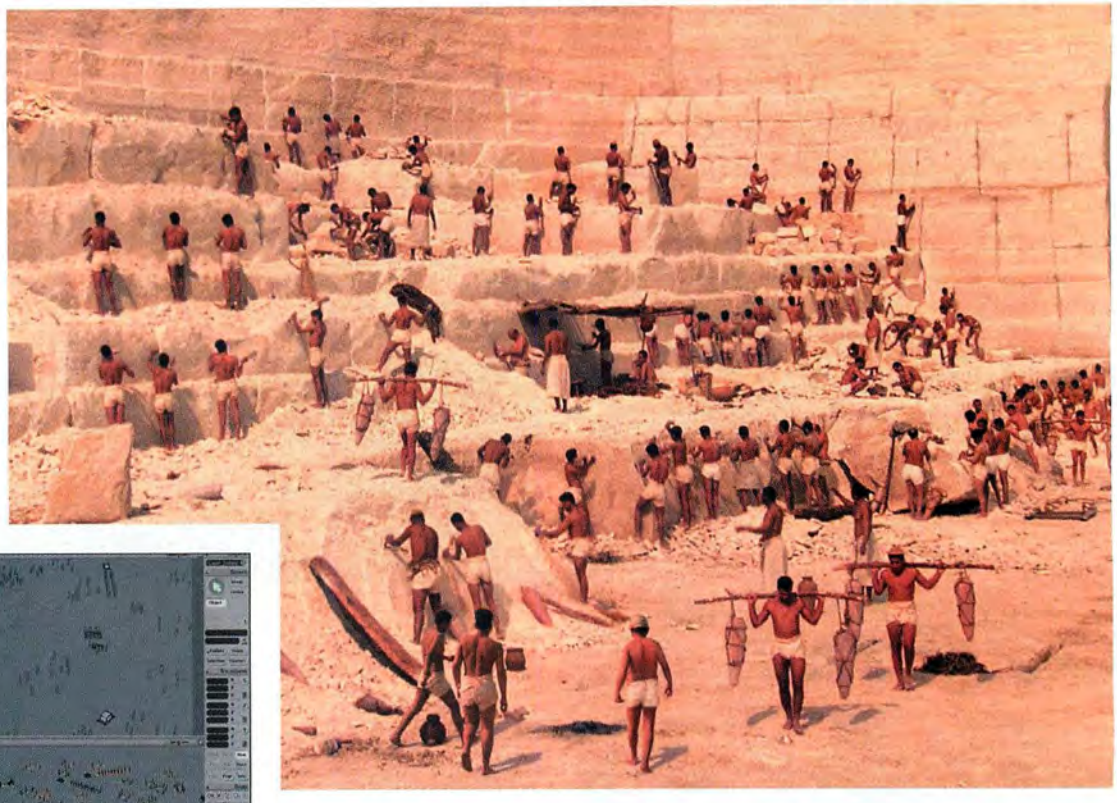
URL
www.mill.tv

CONTACT
+44 (0) 207 2874041

FOUNDED
2001

EMPLOYEES
Three full time, but depends on projects

LIST OF CREDITS:
Rockface (2001), *Dambusters* (2002), *Pyramid* (2002)



ABOVE **Crowds were simulated using single polygon proxies to check the movement was okay. These were later replaced by models consisting of as few as nine polygons**

MAIN IMAGE **The quarry at Turah is still used in traditional ways with each piece of stone carved out by hand, rather than blasted with dynamite**

on a completely different scale. But there were other differences, too.

"One of the differences between working for the BBC and working on a big movie is that things tend to be focused through one person: Jonathan. It's his film from start to finish," says Throssell.

Months were spent talking about the best way to do things, including which package to use, and how to go about lighting and crowd replication. "We looked at all the different packages and tried to work out what was going to be our best software solution," recalls Throssell. "We had to work back from the renderer because we wanted it to be as real as possible."

"We've been very happy with the experiences we've had with *mental ray* and *RenderMan*" he continues, "but decided that something like *XSI* could give us an all-in-one package because, unlike films, in television sometimes one guy has to do an entire shot by himself. We didn't follow the Mill Film *Maya/RenderMan* route and we didn't want to have this huge rendering pipeline. We also wanted Global Illumination and something scriptable, so we went with *XSI*."

With software decided and an overall plan of the script laid out, Mill TV started hiring in January this year. With a team of twelve hardcore, dedicated 3D artists, modellers, and compositing folk behind him, he set the ball rolling and then stepped back. Since then, Throssell has completed work on *Dambusters*, a documentary about the famous 633 squadron and Barnes Wallis' bouncing bomb. He's currently working on a series about DNA.

In the meantime, the team, headed by Mill TV's VFX supervisor Angela Hunt, were hard at work on building the pyramids – in CG and for real. Dave Houghton, The Mill's premier Egyptologist and *flame* expert, went on the principal five-week shoot with Hunt. Filming was made more difficult by factors such as a small production team and Egyptian government restrictions. Houghton and Hunt were even responsible for setting up the green screens themselves.

"Because of budgetary restrictions, we didn't have access to motion control cameras or rigs like that, so we tended to use basic equipment. We did get the use of a crane for the capstone shot, but that was it," says Houghton.

There were also problems with the fly-by shots. "Originally, we wanted to get the backgrounds of the flyovers on film

> "THE DIFFERENCE BETWEEN THE STUFF WE PRODUCE AND THE STUFF THE COLOUR-CORRECTION GUYS PRODUCE IS PHENOMENAL. IT'S THE DIFFERENCE BETWEEN GOOD CG AND REAL CG."
>
> Dave Throssell, HEAD OF MILL TV

ABOVE AND LEFT **How to fill the Nile with ships? Film one sailing to and fro and use *flame* to composite them**

because it would give us some real footage to embed our 3D pyramids in – which is obviously preferable to creating the entire scene in 3D as it gives the viewer a base in reality," Houghton continues. "The BBC production team then tried to get permission to shoot near the Giza plateau from a helicopter, but we discovered that the Egyptians have very strict rules about airborne photography. We wouldn't be able to use a camera mount in the helicopter as it could be used to mount a machine gun, and any footage taken from the air would have to be processed in Egypt and then submitted for censorship before we could use it."

UP IN THE AIR

This barrier meant that it became necessary to create the scene entirely in 3D after all. However, it didn't mean the trip to Giza was a waste, as Houghton explains, "Angela and I did take some photos – from a tourist balloon trip over the Valley of the Kings – for use as ground textures." To create the ground around the CG pyramids, the 3D team painted bump maps as displacement maps and then textured it using the photos from the balloon trip.

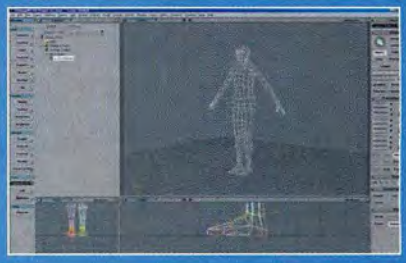
"We cross-referenced our 3D ground with some photos from a book called *Egypt from The Air*, then had to decide when it was looking real. In 3D terms these shots took the longest to create – about five weeks – because of the vast amount of detail in them, particularly the half-built pyramids with thousands of people, blocks of stone, and rubble," explains Houghton.

>>

STEP BY STEP: CHARACTER BUILDING

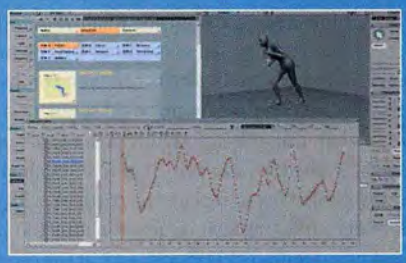
Mill TV's Jordi Bares explains how he used techniques employed by the games industry to help with motion-captured crowds of workers

Jordi Bares was responsible for making the crowd scenes in *Pyramid* look effective and realistic. And one of the ways in which the workers could be manipulated was by using techniques he developed while freelancing at Spanish coin-op developer GAELCO. Budgetary requirements for polygons and memory are incredibly important in video games, where minute slow-downs are brutally eradicated. One way to get around this is to use only the absolute minimum number of polygons required: a fact that Jordi took to heart.



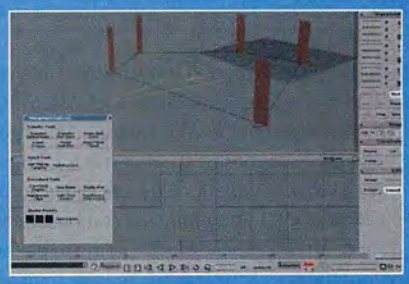
1 "Our memory problems first occurred when using motion capture without an optimised render pipeline. Character parameters were based on things like minimum distance to camera, length of shot, lighting and so on. We started with a 3,000-polygon design and tested it with a raw mode motion capture file."

2 "At 3,000 polygons for a 500-frame motion capture file, we were throwing quite a lot of polygons in rendering, so we reduced the model to only 2,000 polygons. We were still throwing a few, but further reducing the quality of the model wasn't possible and the missing polygons weren't noticeable."



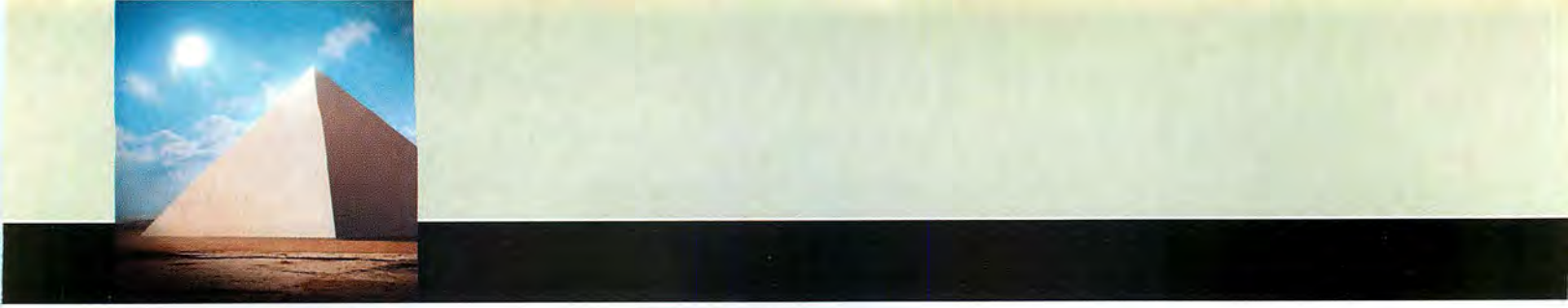
3 "To further reduce memory usage for our example, we changed from using a raw motion capture file by refining the curves coming from it so that we reduced our memory requirements by over a third. Every little counts!"

4 "We renamed every model to save letters in their names. Just getting rid of two letters in every name for 4,000 characters saved a couple of megabytes. This was serious optimisation."



5 "We made sure that we had proxy-level characters, some with as few as twelve polygons, as well as the 'hero' model. This gave us the flexibility to be able to control the animations dependant on the distance from the camera, thereby saving even more memory."

6 "We also did a few tests to make sure we could handle the constraints and expressions we put into the animations. There were 12,000 expressions to slide textures and 8,000 constraints. I was fully convinced we could make it on our little desktop pipeline."



PYRAMID TRIVIA

>> The area covered by the Great Pyramid – some 13 acres – could accommodate the UK's Houses of Parliament and St Paul's Cathedral and still have room to spare. The cathedrals of Florence, Milan, and St Peter's in Rome would also fit quite comfortably inside

>> The Great Pyramid is aligned with the four points of the compass with near-perfect precision. The average deviation of the sides from their alignment to north, south, east, and west is a tiny fraction of a single degree – just 3 minutes 6 seconds

>> It originally contained approximately 2,300,000 separate blocks of stone, each weighing an average of 2.5 tonnes

>> According to the Turin Papyrus, the whole structure was built in 23 years. Other sources imply 30 years or slightly more. A rough calculation based on a 10-hour working day suggests that 34 stones (2.5 tonnes each) would have been laid in place every hour – this is slightly more than one block every two minutes

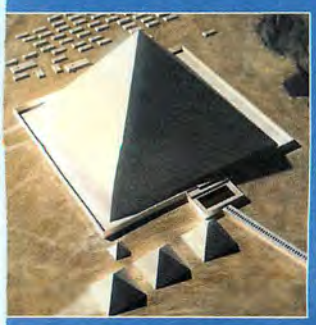
>> When it was built, the Great Pyramid rose to 481 feet (146.6 metres) – the top 31 feet (9.45 metres), including the capstone are now missing

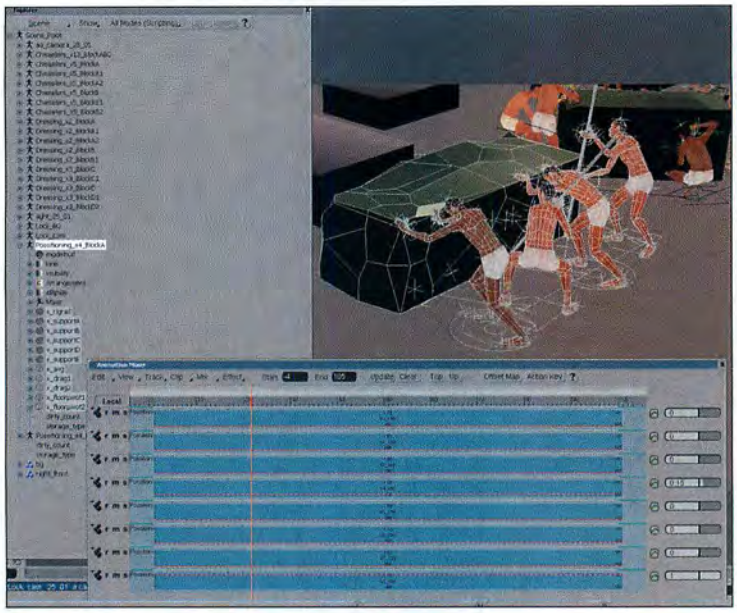
>> Its total weight was almost six million tonnes

>> The horizontal cross-section of the Pyramid is square at any level, with each side measuring approximately 756 feet (230.42 metres). The side lengths of the Pyramid are identical to within two inches

>> The four corners of the Pyramid are almost perfect right angles and the sloping angle of its sides is exactly 51 degrees 50 minutes and 40 seconds

>> Workers would need to have quarried just over 11,000 cubic feet (or a little more than 300 cubic metres) of stone every day





ABOVE **The way the capstone shot was originally planned was quite claustrophobic. With CG elements, the camera could pull back revealing the pyramid in its entirety in a way not possible previously**

LEFT **Jordi Bares' flexible worker team methodology meant that highly individualised teams could be modelled and animated separately**

Jordi Bares was in charge of creating those thousands of CG people and he took a distinctly games-based approach to the problem of dealing with polygon budgets (see the step-by-step boxes). With the library of animation he had built up over the course of the five months he worked on the programme, Bares could ensure that the crowds were full of people, each doing their own thing. This contrasted with previous crowd simulation techniques. For instance, while Mill Film had used a particle-based simulation to create the crowds entering the Colosseum in *Gladiator*, using the system to assign positions and velocities to individual members then asking *RenderMan* to replace the particles with actual models at render time, this technique was a little too simplistic for what was required in *Pyramid*. And, at the other end of the scale, there was dedicated software like *Massive*, WETA Digital's battle-scene simulation tool. *Massive* is ideal for when people start off doing one thing but subsequently switch actions according to whatever is going on around them – a crowd simulation concept called autonomous behaviour – but it was a little too complex for what Mill TV required. After all, these weren't going to be shots spanning a day, and the people were going to have their tasks to do, which would make their motions relatively repetitive. Of course, there was always Softimage's own *Softimage|RTK*, but at the time, it wasn't ready for use on the project. The team also looked at a variety of other options including *AI.implant for Maya*, but found they were all too games-oriented. In the end, *XSI's* scriptable nature meant that this was the tool for the job: not only could Mill TV create individuals based on the motion captured at Centroid 3D, but also teams of people, without making scenes unwieldy.

> "THE MORE WE WORKED ON THE PROJECT AND BROKE DOWN JUST WHAT WAS NEEDED, THE MORE WE ACTUALLY BELIEVED THAT THE THEORIES PROPOSED [ABOUT HOW THE PYRAMID WAS CONSTRUCTED] WERE ACCURATE." Jordi Bares, THE MILL

FORESIGHT AND FLEXIBILITY

In designing the crowd system, Bares had the foresight to put in extra controls. "They saved my life later when the director wanted to push the animation even more: I had designed the skeleton rig to be able to morph based on the terrain, so the character could easily go through a flat area, then up a hill, and then down – without any change to the animation or the motion capture clip," Bares says. Of course, this meant that these additional details had to be taken into account when the motion capture was performed. "The rig had to be very sophisticated to be able to extract the data in the way I needed to maintain that structure. Then the actions were all taken on flat terrain and the actor was responsible for adding extra effort – sometimes with the aid of an extra 10kg of stones attached to his body," recalls Bares, wryly.

While The Mill's closeness to the work provoked an interest in all things pyramid-related – such as whether the chisellers moved around the pyramid to avoid sunburn, or what happened when you were caught short at the top of this enormous edifice – the work was pretty much cut and dried. In a way, it was easier working with such precise measurements because it meant that there was less interpretation to do. With a team of eminent Egyptologists such as Professor Mark Lehner and Egyptian Antiquity expert Zahi Hawass all concerned with one area or another of the

study of ancient Egypt, there was little discussion to be had over the rights and wrongs of CG choices. Even so, the Mill team had to be flexible, as things were changing all the time, with new theories cropping up all over the place. Fortunately, director Jonathan Stamp remained very close to the animators, visiting the team at least once a week to bring news of the production or to offer advice.

BOOK OF THE FILM

In common with many other BBC projects, the TV documentary is to accompanied by a book on the subject. Mill TV had to provide images at 6k line resolution to make images large enough to cover an entire page, something that the producers of the book weren't quite ready for.

"They asked for a bunch of pictures we had already rendered for television and didn't quite understand the effort we would have to go through to make them ready for print," says Throssell. A fair amount of work was needed to convert the beautiful images seen on the TV to the print-resolution work needed for a book. "For a start, television images are transmissive – light comes through them, making the colours brighter; whereas print is reflective, meaning that everything has to be changed in colour terms," he explains.

The result of all the hard work over five months or so of filming, CG, and compositing is quite remarkable. CG characters mix with live-action ones with no discernable differences, making it hard for Throssell to justify what his team had done to the layman: "Any shot in *Walking with Dinosaurs* is obviously CG, because you just don't get dinosaurs any more. On this project, you show people and they say that it looks good and we say, 'We've had to replace all this and we've done all this' – and they say, 'Why?' Answer: because you just don't get pyramids like that any more..."

The story itself is humanised by being told from the point of view of Nakht, a fictionalised but highly researched character who is one of probably 20,000 farmers to be conscripted to build the pyramid at the start of the documentary. The show follows his progress as he rises higher in the ranks of the conscripts, continuing to work on the pyramid while many of his colleagues return to their homes and farms. The story follows him down the Nile to Giza, then into the quarries where the stone is carved out and onto the pyramid itself. Anyone wanting to know exactly why anyone in their right minds would do a job like this willingly (these people aren't slaves, remember) will have to wait for the end of the programme for all to be revealed. With 23 minutes of CG out of the 50 or so that the programme runs for, *Pyramid* is a project that demanded the full attention of the Mill TV team just to conceal all the work that went into it. Throssell concludes: "It's not supposed to be an effects extravaganza, it's supposed to be something you watch and learn." ■

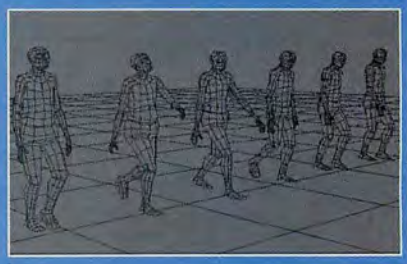
WEB: WWW.BBC.CO.UK/HISTORY

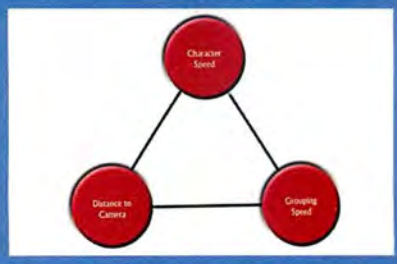
Pyramid airs on BBC1 in the UK on Sunday 27th October 2002. A fully illustrated hardback book also accompanies the series from BBC Worldwide. *Pyramid* is a BBC production for BBC1 in association with Discovery Channel and NDR

STEP BY STEP: TEAM BUILDING

Having perfectly animated characters is one thing, but you really don't want to hand animate them all. That's where teams come into play

Each team of workers in *Pyramid* is made up of individuals, some pushing a block of stone, some pulling, some levering the stone to make it easier to push, and others pouring water down the slope to help lubricate the clay the stone runs on. However, to animate all these people efficiently, you need to make them a team. Again, Jordi Bares copied some of the techniques used by the games industry to make the process of managing a team of models easier. Here's how thousands of characters can be made from just one.





1 "I experimented with a group of five guys, using five completely different walk cycles. We measured how much morphing that group could take and how much 'slide' would be acceptable without artefacts or glitches in the animation"

2 "We also calculated whether the distance to the camera would become problematic. From these tests we extracted a series of rules that activated an alarm to put special models in place, or even a second team to make the animation look better."

3 "We built teams from blocks of five, 12, and 20 men, which were all made from copies of the same character with a few standard animation cycles. These teams were all associated with a morphing rig so that we could manually offset any parameters we wanted to."

4 "To help differentiate the characters, I designed a tool that goes through every single character at a late stage in the pipeline and applies morphing setups based on a near-infinite combination of up to eight morph targets with random weighting."

5 "We also randomly added animation offsets to prevent the so-called 'Marching Effect' [all the characters in step] and also to change the textures placed on them. This way, a simple bunch of identical copies of one model becomes a fully randomised team in less than a minute without any really tedious work."

6 "If the *director wanted more* fat guys we were able to tweak everything, add bits here and there manually, and even modify animations. We could add accents to individual animations to break up the bunching of a group of people more and even delete individual members of any given team."

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Primal Pictures

Primal Pictures is building an anatomically correct computer-generated model of the human body. Gruesome? Or a 21st century version of Gray's Anatomy? **BY MARK PENFOLD**

London-based 3D production house Primal Pictures *is a very different type of* CG business. In the past, it has created animation for film, television and advertising, but its current focus is on a more serious – and much more intimate – subject. Primal's long-running project is to build and animate a fully accurate 3D map of the human body, to be used by doctors, medics and therapists as an aid to teaching and a deeper understanding of human anatomy.

Despite their unusual subject matter, co-founders Chris Briscoe and Laurie Wiseman both come from more traditional production backgrounds. Chris has an award-winning career in the industry following his work at the helm of graphics house Digital Pictures, while Laurie worked at TVAM and later produced documentary films for UK terrestrial broadcasters ITV and Channel 4.

Initially set up in 1991 as a research group investigating techniques for creating high-resolution graphics for medical teaching, Primal Pictures was jump-started with grants from the EU Media fund and UK government. Its current aim is to develop a medical reference text that takes advantage of modern computer graphics. This monumental task is still being carried out by a team of artists, anatomists, animators and medical consultants. The project is now a good way towards completion, with the final deadline set for the summer of 2003.

BIOGRAPHY

Set up by Chris Briscoe and Laurie Wiseman in 1991 as a research group into medical imaging, Primal Pictures has grown into an ambitious project to map the human body in three dimensions. Building on knowledge developed over years working with digital effects, Chris and Laurie have established a highly skilled team of animators, medical imaging experts and anatomists dedicated to creating an accurate model of the entire human body, from bones to blood vessels and nerves. The entire project is due for completion in the summer of 2003.

Those sections of the body already completed have been acclaimed by learned medical journals and practitioners from around the world. Primal has recently taken the step of making its content available online with www.anatomy.tv, thus broadening its potential audience and making access to its range of body parts more flexible.

Following a recent funding round that raised £3 million and the launch of a Web-based product, Primal continues to expand. The future holds a number of challenges as the company also aims to make an animated model of the body with life-like muscular movement and interactions. This will be based on ground-breaking animation research currently being carried out by Primal's in-house team.

Primal's animated models show how muscles move and interact

All work and no play makes Jack a dull boy. There's time for fun and games even in the underworld

#041

The production process is a painstaking one. Jamie Stewart, one of Primal's 3D artists, takes up the story: "The cadaver which we use as the basis for much of our work has previously been deep-frozen, then sliced from top to bottom at millimetre intervals. We use digital scans of these cross-sections as the basis of our models, so trips to the morgue are kept to a minimum. Although the morgue isn't that bad – once you get used to the smell and the sound of sawing." These scans are then converted to curves by anatomists tracing around the muscle, bone and tissue. Finally the curves are used to build a three-dimensional model.

"For the more intricate parts of our work, the sliced cadaver is not clear enough. We have a close relationship with the London teaching hospitals but sometimes we need to find our own models," explains Chris. Fortunately, this doesn't entail midnight visits to the cemetery; instead, images are captured using medical scanners. For example, the production of the hand required one luckless Primal employee to keep his arm dead still for hours of repeated MRI scanning. This model citizen suffered only mild discomfort as a result, but at least he was in good company should things have turned nasty.

The level of detail expected from the artists at Primal is extraordinary. Even the most avid gamer is unlikely to complain if the bones in their favourite character's foot aren't arranged correctly, but one hopes the average GP would notice right away. Chris Briscoe elaborates: "Our work has to be extremely accurate given that it's going to be used by doctors and surgeons the world over. The majority of the reference material comes from the Visible Human Project, but where that is not detailed enough our artists must model complex structures from textbook explanations. It's very technical work."

For its modelling, texturing, animation and rendering, Primal uses only Side Effects' *Houdini* 3D software. Traditionally associated with special effects blockbusters such as *Blade 2*, it was the procedural nature of *Houdini's* architecture that attracted Primal. "One of the reasons we chose to work exclusively with *Houdini* was that if anything is going to go wrong with our models then it tends to happen in the final stages. *Houdini* gives us the flexibility to be able to correct those errors without rebuilding the entire model, many of which comprise up to 15,000 separate structures," explains Chris.

The work produced by Primal consistently wins awards from medical institutions and organisations around the world. However, the company is not content with modelling an inanimate copy of the human body. Under the leadership of its head of research and development, Vasili Hurmusiadis, Primal is now working on animated models that show the action and interaction of the body's muscles. "This part of our work is particularly interesting. Interactive Functional Anatomy is very challenging but also groundbreaking," comments Vasili, formerly course leader at Bournemouth University's highly respected National Centre for Computer Animation.

Despite the gravity of its subject matter, the atmosphere isn't as academic as you might expect down at Primal's London studios – although its field trips might not quite be to everyone's taste. As Jamie Stewart comments wryly: "While other companies might have a day out at Alton Towers, we go along to the morgue and watch old men have the tops of their heads removed!" ■

NAME	Chris Briscoe
AGE	54
JOB TITLE	Creative Director
COMPANY	Primal Pictures
BASED	London
WEB SITE	www.primalpictures.com
PRODUCTS USED	*Houdini*

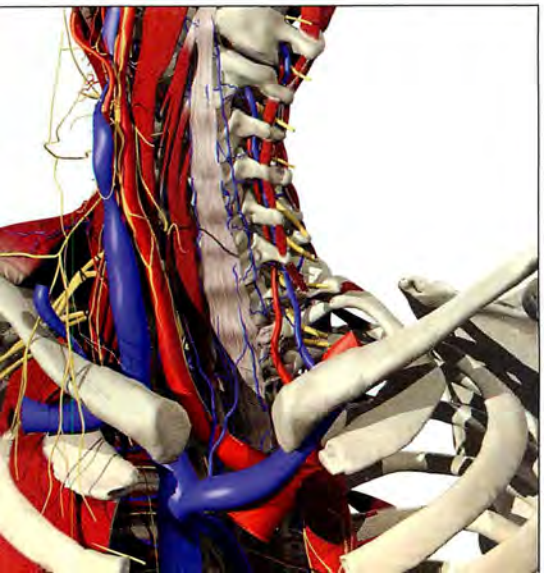
FUTURE GOALS

"Our work currently relies upon pre-rendered models built up in layers, some containing more than 15,000 separate structures. In the future, we plan to build a dynamic muscular model of the body which will be fully interactive in a way that has previously been impossible."

CREDITS

British Medical Association Electronic Product Gold Award 1999 for Primal Pictures Interactive Knee Radiology Edition (1999), **British Medical Association Electronic Product High Commendation Award 2000** for Primal Pictures Interactive Shoulder (2000), **2001 Europrix Award** (European Union award for best e-learning and Education product) for Primal's 3D Interactive Series (2001), and **2001 Vesalius Award for Medical Illustration** (The premier US award for medical graphics) for Primal Pictures Interactive Head and Neck (2002).

Digital scans of cross-sections of a human cadaver are used to map bones, blood vessels and nerves



Primal's 3D map of the human body will help doctors and medics to better understand our inner workings

Although normally associated with film effects work, *Houdini* proved vital in creating these intricate models

"WE HAVE A CLOSE RELATIONSHIP WITH THE LONDON TEACHING HOSPITALS. BUT WE STILL SOMETIMES NEED TO GO OUT AND FIND OUR OWN MODELS..."
CHRIS BRISCOE, CO-FOUNDER, PRIMAL PICTURES

Crowd Control Productions

As its long-awaited title, *EVE: The Second Genesis* nears completion, we went to talk to Iceland's sole online games developer about digital art, diversity – and darkness

BY CRAIG GRANNELL

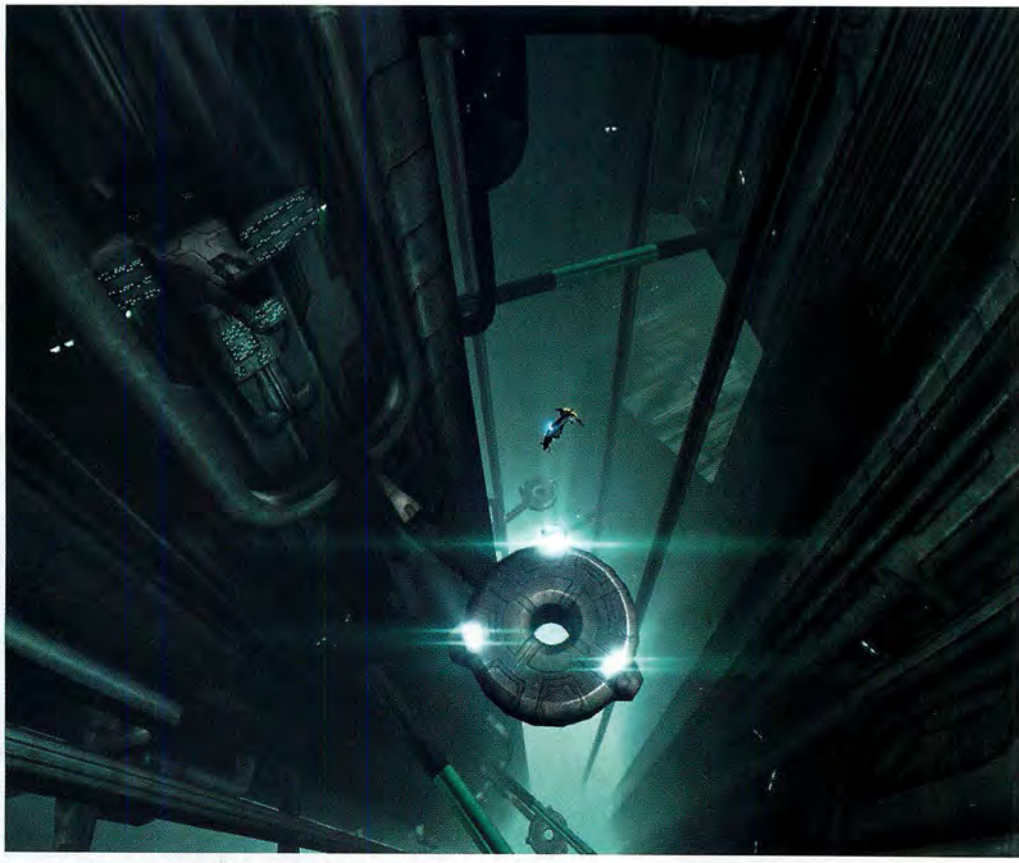
When people think of Iceland, they imagine an inhospitable rock in the middle of the Atlantic, with people eking out an existence in a cold, harsh climate. However, upon visiting the country – and in particular its capital, Reykjavik – you discover a lively and cosmopolitan society that has embraced technology more vigorously than almost anywhere else in Europe. However, as anyone who's flown into Keflavik airport or witnessed the Aurora Borealis will testify, Iceland also has an 'other worldly' quality. So what better setting then for the location of Crowd Control Productions – or CCP – currently putting the final touches to the ambitious space game, *EVE: The Second Genesis?*

The company itself was founded five years ago with the sole aim of developing this game, and while the final product will only be available online, it has high production values nonetheless. "We don't make the distinction between online and offline when it comes to quality," claims CCP 3D artist Kári Gunnarsson. "The difference is strictly with regards to software architecture."

According to Kári, creating 3D content for online games is no different from making graphics for other sorts of 3D game, since the graphics engine is running client-side. "No graphical data is transferred between the server

"THE DIVERSITY OF NATURE IN ICELAND IS ASTONISHING – IN MANY WAYS, IT'S LIKE BEING IN A SCI-FI MOVIE, AND YOU CAN'T HELP BUT BE INSPIRED WHEN WORKING HERE."
SIGURDUR ÓLAFSSON
MARKETING MANAGER, CCP

An Amarr frigate blasts away in Crowd Control Productions' upcoming title, *EVE: The Second Genesis*. The on-screen display provides details of your location, speed, and character



A docking bay shot from within the game. The scale of the project is mirrored by the in-game architecture!

and client during runtime," he says. The only limitation was the requirement for the game to run on a wide range of systems. "Even if [a game] is intended for hardcore users, it has to be accessible to a wider audience, so we were limited to some degree graphics-wise."

Despite this, the in-game graphics are impressive stuff and few corners have been cut to keep bandwidth to a minimum. Favoured software for this project has been *Maya* for all 3D content, with popular workhorse Adobe *Photoshop* called in for texture work. "We also have a proprietary in-house tool we lovingly call 'Jennifer' for advanced shading and content authoring for final game content," explains Kári.

This has enabled CCP to make the feel of the *EVE* world graphically appealing, while also striving for a quality of dark realism. Unusually, CCP also avoided using other games for inspiration when working on the project. "We didn't want to create a game with a 'cartoony' feel to it," says Kári, "Instead, we looked towards movies for the look, feel and atmosphere of the game." He cites *Blade Runner* and *Aliens* as being especially dominant in that sense, but those with long memories will spot other references, too.

"Ah, yes, *Elite*," says CCP's marketing manager, Sigurdur Ólafsson. "We're all big games fans here, so it's no surprise that elements of such a classic have crept into *EVE* – not least due to them both being epic games set in space."

Sigurdur also acknowledges that an 'endless list' of science fiction books and movies played their part in the development of *EVE*, as well as the country itself. "The diversity of nature in Iceland is astonishing," explains Sigurdur. "In many ways, it's like being in a sci-fi movie, and you can't help but be inspired when working here."

"And of course, people comment that Icelandic nature looks like the surface of the moon," interjects Kári. "So I'm sure some of the odd Icelandic landscape has seeped into the game world through unintentional inspiration, which can't be a bad thing for a space game like *EVE*."

Being situated in Iceland has brought other benefits to CCP, too. "As we're the only online game development company here, this puts us in a unique position, as we get first grabs on the local talent pool," says Kári.

It's safe to say that CCP's team contains a high level of talent, both with regards to graphics and programming. The majority of CCP staff have worked for other Internet companies and games developers, and most have a diverse set of skills. "Bringing that knowledge into the game production has proven invaluable," says Kári, inferring that this has ensured *EVE's* success so far.

In fact, Kári himself has been in the industry for five years now, despite being only 22. "I had a stint for SR Studios working in a PlayStation title, and then for a mobile games company called SOCO. Soon after that, I was spotted by the art director at CCP and hired," he says.

Despite the general downturn in the industry, Kári reckons it's a great time to be working in the game development industry, particularly as a 3D artist: "We're finding photorealism is beginning to show its face in games, and I'm excited about seeing what will arrive in the wake of *EVE*."

However, prior to that, there's still the small matter of launching *EVE* in early 2003. "In fact, we're always looking for new ways to increase the graphical quality of our game, and new ideas arrive every day," says Kári. "We're currently polishing the graphics and implementing things we could only dream about at the start of development – the project has grown tremendously in scale from the original concept. However, I'm convinced that I, for one, will be very content with the final look of the game." ■

NAME	Crowd Control Productions (CCP)
FOUNDED	1997
EMPLOYEES	30
TEL	+354 511 4999
WEB SITE	www.ccp.is
PRODUCTS USED	*Maya, Photoshop, alienbrain*

FUTURE GOALS

According to Sigurdur Ólafsson: "Expansion packs for *EVE: The Second Genesis* are likely to take up much of CCP's time in early 2003. Other secret projects are also in the works."

A Jovian Wraith frigate shown from underneath, its lights glowing against the black sky

The character creation system within *EVE: The Second Genesis* enables you to customise your character's appearance down to the finest detail

Another screen from the docking bay sequence. *Blade Runner* and *Aliens* were both crucial sources of inspiration for EVE's development team

BIOGRAPHY

Crowd Control Productions, better known as CCP, was founded in 1997, and is based in Reykjavik, Iceland. Rather uniquely, the privately held company was formed solely to develop a single massive online multiplayer game *EVE: The Second Genesis*. The 30-strong staff have varied backgrounds in the worlds of games design, 3D graphics, and the Internet.

For instance, art director and co-founder Reynir Hardarson was lead graphic designer at software house OZ.com. There, he worked on and art directed the company's major graphics projects, such as the interface for the real-time VRML browser, OZ Virtual. He also worked for various design agencies and taught graphic design at the Akureyri School of Art.

The company aims to become a pioneer in the field of massively multiplayer games, a genre which it claims is still in its infancy. It aspires to create gaming environments where the players are the central focus, and where the role of AI is kept to a minimum.

While the downturn in the design industry made it harder for CCP to get venture capital, it used the situation to strengthen its crew, and is now making final preparations to launch *EVE*. More information about the game, which is due to go live early in 2003, can be found at www.eve-online.com.

CREDITS

EVE: The Second Genesis, 2003 (conception, production, and realisation)

Robert Bradbrook

The creator of the award-winning short *Home Road Movies* has an artistic sensibility he brings to life in deeply evocative imagery

BY MARK PENFOLD

Robert Bradbrook's latest project, *Home Road Movies*, has made him something of a celebrity on the animation circuit. Described as by New York's Museum of Modern Art as 'truly breathtaking', his short, independently produced film has won prizes at major festivals across the world, and even garnered its creator a British Academy Award nomination.

Yet Robert himself remains genuinely unfazed by the critical reception of his work; as an artist, he's just trying to tell a story to the best of his ability. "I wanted to make a film that would make my sister cry and my brothers laugh. I succeeded, and that made me happy."

Robert's artistic endeavours began while working as a cartographer – in his spare time, he would make slide shows and cine films for his friends and family. As Robert recalls: "I quickly came to rely on computer-generated elements in my slide shows and movies in order to enable me to tell a story." In 1991 this led him to return to college to study for an MA in Electronic Arts.

In 1993, following his graduation from Coventry University, Robert produced his first five-minute animated short, *End of Restriction,* which followed the life of a young boy living in an English village. Working alone on his Apple computer using *Infini-D,* Robert began to develop a visual style uniquely suited to telling very human, personal stories.

Home Road Movies expands on this technique while also telling the story of Robert's own father and his attempt to show his love for his family through the car that took them on holidays throughout Europe.

With a budget of just £80,000, Robert worked alone for two and a half years to complete the 12-minute film. All the scenes were built in 3D using *form•Z,* with rendering being handled by *Electric Image*. Although he did get a little dewy-eyed about *Electric Image's* capabilities, Robert maintains: "It's the need to tell stories that I am compelled by. The computer simply frees your imagination so that you can include things that, if done with live action, would have blown the entire budget for the production."

Home Road Movies uses live actors to portray the characters, the father being played by veteran British actor Bill Paterson. The actors, recorded against a blue screen, were then imported into the 3D scenes and shadows were added to ground them in the frame. On the subject of pure CG, Robert remains unconvinced. "Even in fully CG movies, the basis for the movements of characters is captured from live actors. It's the little tics and accidents you get from live actors that give their performance a depth which is too easily lost with the computer."

What's unusual about *Home Road Movies* – and Robert's work in general – is that it's aimed at a different audience to much of today's animation. "I grew up with James Bond movies, so I think Continental casinos are cool. It's assumed that today's audience for computer animation grew up with *Star Wars* and only wants to see science fiction. But I'm more interested in conveying emotion and character." ■

NAME	Robert Bradbrook
AGE	38
JOB TITLE	Animator/ Director
BASED	London
WEB SITE	www.bradfilms.co.uk
PRODUCTS USED	*form•Z* and *Electric Image* on Apple PC

FUTURE GOALS

Robert is busy with commercial work, but plans to make another personal project, commenting: "I'll continue to make movies about people not usually found in the limelight."

The scenes were created using *form•Z* and rendered in *Electric Image*, resulting in a unique visual style

The reflection in the water is a clever way of getting both the car and the Eiffel Tower into this Paris scene

Live action by Bill Paterson, as Robert's father, was filmed against a blue screen and woven into the 3D

A deeply personal project, *Home Road Movies* is the product of two and a half years of painstaking work

"I WANTED TO MAKE A FILM THAT WOULD MAKE MY SISTER CRY AND MY BROTHERS LAUGH. I SUCCEEDED, AND THAT MADE ME HAPPY."
ROBERT BRADBROOK,
DIRECTOR, HOME ROAD MOVIES

GIGANOTOSAURUS CAROLINI

He's far less intimidating if you don't have to model him yourself.

This is just one of over a hundred different dinosaurs currently stalking the Turbo Squid servers, along with tens of thousands of other 3D models, textures, and more. You can find this one and others like him by searching for "dinosaur", or you could do a specific advanced search for a polygonal model of an "extinct cretaceous therapod" with more than 1500 polygons, fully jointed, with textures and materials included. The whole process, from launching the web site to having him in your scene, takes just minutes, giving you the kind of competitive advantage that put mammals on the map.

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Pro tip for particles

Particle systems: complicated, unwieldy and only useful for animation? Not at all. Particles can produce many weird and wonderful effects, from subtle dust clouds, storms and swarms of insects, to stylised special effects for static images. To kick off our new regular tips section, our contributing experts show you how to get the most out of them

Our experts

>> ENI OKEN

Eni Oken is a freelance digital artist with 15 years' experience in CG. She specialises in creating fantasy and whimsical designs and textures and offers online workshops at www.enioken.com.

>> BRANDON DAVIS

A freelance artist, technical director and author, Brandon was closely involved in developing *3ds max*. He's also worked at Blur Studios, Digital Dimension and Computer Café. www.particlefx.com

>> ALLAN MCKAY

Allan works at Cutting Edge VFX in Brisbane. He describes himself as "kind of doing everything" and is currently working on effects for the feature film *George of the Jungle 2*. www.3dluvr.com/machette

>> MASH

More commonly known as Matthew O'Neill, Mash is currently employed by Maxon Computer, the creators of *Cinema 4D*. His main role is to oversee technical support queries. www.imashination.com

>> DAN ABLAN

Dan is author of the popular *Inside LightWave* books plus the recently published *Digital Cinematography and Directing*. He runs 3D animation company AGA Digital Studios. www.agadigital.com

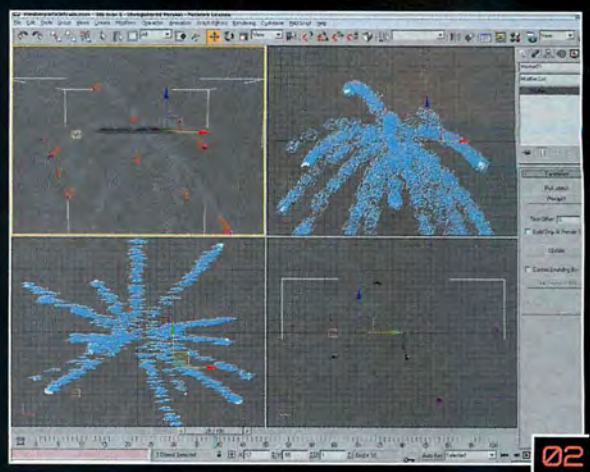
S

01

KEY TO IMAGES

01 STAR EFFECTS
Eni's picture *Bag of Tricks* is a great example of how particles can be used to enhance static pictures, with the judicious use of glows and lighting.

02/03 EXPLOSIONS
Want your particles to be able to emit fire and smoke in *3ds max?* Use a Mesher Compound object and gain far more control for explosions and the like.



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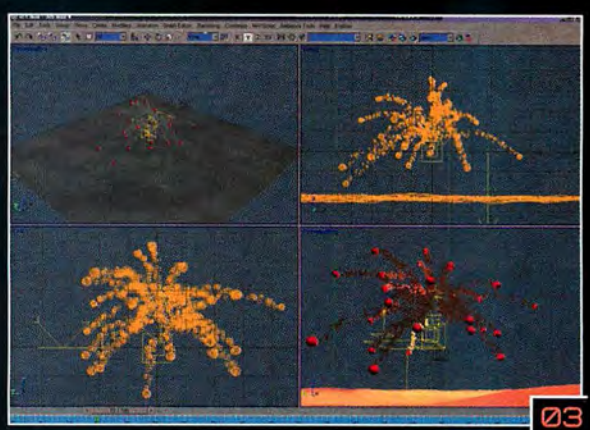


03

Magical stars

REQUIRES: ANY 3D PACKAGE

Particles can be used not only in animation but also in still imagery. A shower of particles can be particularly useful when creating 'magical' effects, such as a spray of stars. To do this effectively, the 3D software must have the option to add a glow to each individual particle. Some software will even enable you to shift colours to form a multi-coloured shower of stars.

If your software doesn't include the option to add glows to individual particles but does let you treat each one as a poly face, you can create a self-illuminated material (shader) with a star-shaped opacity map to it – opaque in the centre and transparent around the edges. This will make each particle look like a star. If this is the case, some lights must be placed strategically inside and around the particle spray to simulate the light emanating from the stars.

When the spray of stars is combined with some smoke and well-placed glows, it can look particularly 'magical'. You can see this in my image *Bag of Tricks* (above), which shows three particle sprays. In this case, the shower of stars starts from inside the bag, where a large glow is placed. Each star spray was combined with another particle spray simulating smoke and a large flare at the end.

>> ENI OKEN

Convert to a mesh

REQUIRES: 3DS MAX

Here's a problem. Say you have object fragments from a PArray that you want to have emit fire and smoke particles. Normally you can't do this because particles cannot be emitters. The Spawn Trails feature works to a degree, but has problems. For instance, say your emitter particles are affected by gravity but you want your trailing particles to be affected by different space warps. Can't do it.

The solution: the Mesher Compound Object can convert a particle system into a procedural mesh. This mesh can be adjusted independently of the particle system, but will retain a dynamic link to it. So if you change the particle system, it will also change the Mesher object.

In the example file on the disc, I've blown up a GeoSphere with PArray, then aligned a Mesher object to convert the fragments to a mesh. That gave me two new PArrays that emit from the Mesher.

>> BRANDON DAVIS

Meshes: further tips

REQUIRES: 3DS MAX

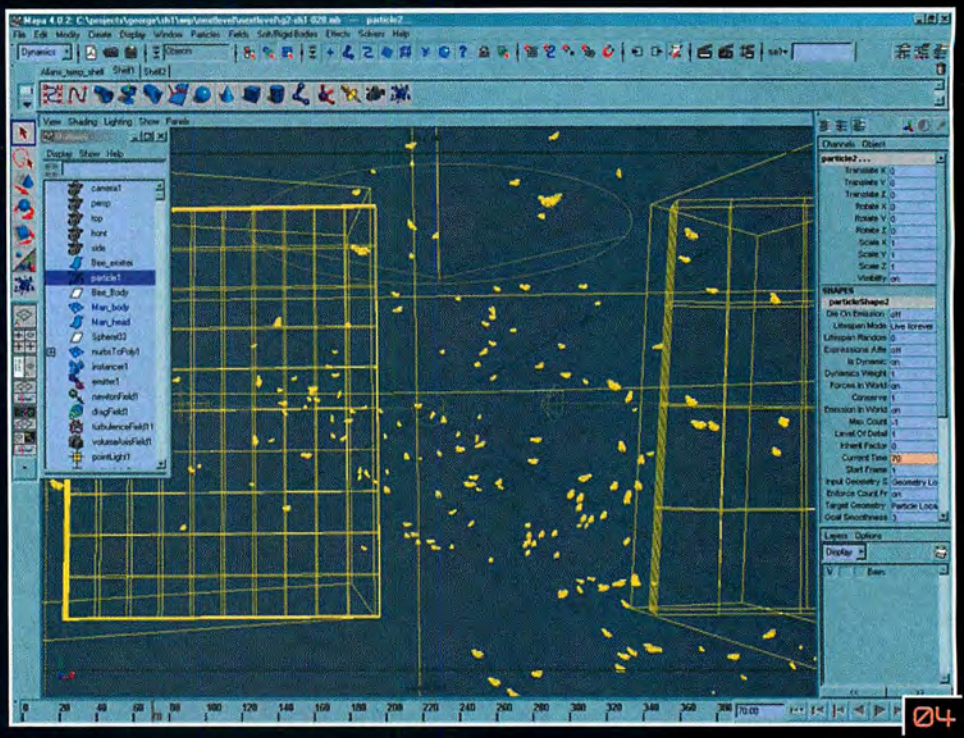
1. The particle system you use to trail from the Mesher needs to have a sufficient Birth Rate. If you have 25 fragments, you may >>

need 75 particles per frame. For a massive explosion sequence I worked on, I had several particle systems that emitted 900 particles per frame.

2. You can edit the Mesher in very cool ways. For example, several times I made fragment passes with flame and smoke, but the VFX Supervisor would say, "I like these, but get rid of this one and move that one over there." You can do that with this technique! Just throw an EditMesh on the Mesher object and edit away. You can delete fragments (elements) or resculpt them to a degree. You can also move them and the trajectories will be respected.

3. Mesher won't automatically snap to the position of the referenced object. So you can retime and reorient it independently. Aligning it can be a pain sometimes and occasionally it will disappear completely from your scene, but this is often remedied by just unhiding the reference object.

>> BRANDON DAVIS



04

Creating insect swarms

REQUIRES: MAYA

On a couple of occasions I've been given the task of animating large swarms of bees or other insects attacking people. What sounds like a fun FX shot can turn into a nightmare if it's not set up correctly, and when your VFX Supervisor asks for even the simplest of changes towards the end of the project, they can sometimes mean starting again from scratch if you haven't organised your workflow intuitively.

A bee swarm can consist of just the particles emitting from a sphere and a Newton parented to the sphere. The Newton should have a negative value (not too high, though) to make the bees follow it, with two sets of turbulence: one of a low frequency for big arching flows, and a second of a finer frequency to show more activity happening inside the swarm. Put volume fields around the camera and objects you want it to avoid.

Now it's just a matter of animating the sphere to control where you want your swarm to fly, and they'll dynamically react to this. From here you can begin putting complex expressions and functionality into the shot making it more dynamic and amazing, while knowing that animation and primary life of the swarm is easy to change and retime.

>> ALLAN MCKAY

Avoid crashes

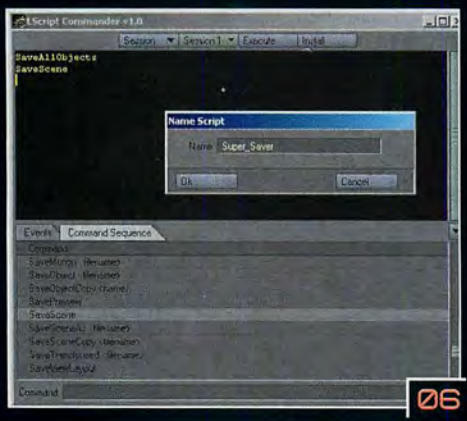
REQUIRES: LIGHTWAVE

Particles can be very taxing on your system, especially if you're rendering a lot of them, and working with them does tend to increase the chances of your computer crashing. If you're working in *LightWave 3D 7.5*, you are probably well aware that in order to properly save your work, you need to do two things. You first have to select Save All Objects from the File drop-down menu. Doing this ensures that your objects retain any textures and image maps you've applied. Next, you need to select Save Scene from the File drop-down menu to save your motions, lights, object placement, and so on. What a pain!

But it doesn't need to be that way. The following simple steps will show you how to instantly create one button that will do it all.

1. Click over to the Scene tab at the top of Layout.
2. From the left-hand side of the screen, open the Generic list of tools under the Utilities heading.
3. Select the LScript Commander, labelled as LS Commander. Figure 4 shows the panel.
4. In the LScript Commander, select New Session from the Session drop-down list.
5. At the bottom of the Commander interface, click the Command Sequence tab.

05



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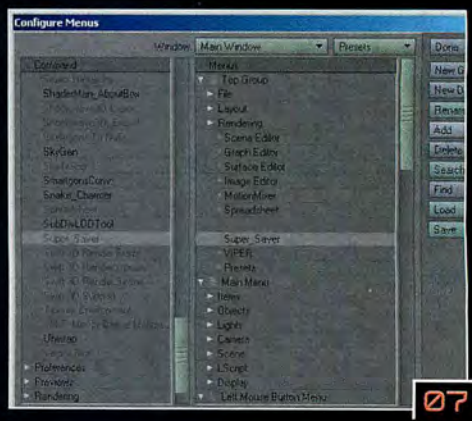

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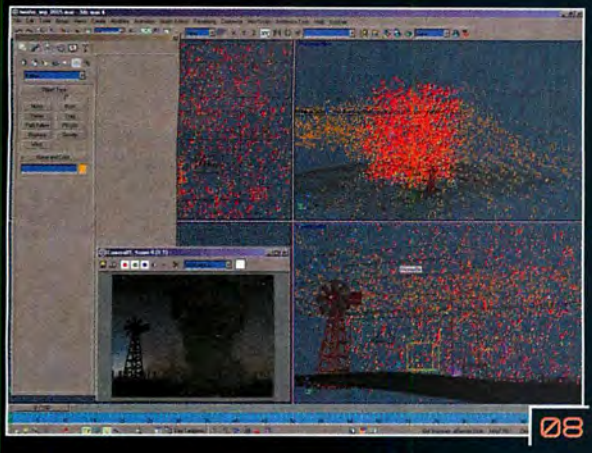


08

6. Move down the list with the slider at the right, and find the Save All Objects command.
7. Select the command and drag it to the top window.
8. When you've done that, find the Save Scene command, and drag it up to the top window.
9. Next, click Install at the top of the panel, and you'll be prompted to name your new script. Type in Super_Saver.
10. You should see a message saying: "1 plug-ins have been successfully added." This will be either at the bottom of Layout if you have expert mode on, or a pop-up for beginner mode.
11. Close the LS Commander and click the Layout drop-down list at the top left of Layout.
12. From the Layout drop-down list, select Interface, then Edit Menu Layout.
13. On the left side of the Configure Menu panel that appears, click the small white triangle next to Plug-ins, to expand the list.
14. Scroll down and select the Super_Saver plug-in you've created.
15. On the right-hand side of the Configure Menus panel, select the blank area underneath the Spreadsheet plug-in listing from the Top Group heading, then click Add, as in figure 7.
16. Click Done, and you'll now see a Super_Saver button on your Layout screen at the left-hand side. Use this any time you want to save your work! Clicking it once will save all objects and save your scene, eliminating the annoying two-step saving procedure mentioned earlier.

>> DAN ABLAN

Whipping up a storm

REQUIRES: 3DS MAX

The simplest way to go about making a twister in *3ds max* is to create a PArray particle system and tell it to emit from a 2D plane. Create a wind Spacewarp with 0 strength, and a vortex Spacewarp; link them both to the plane and bind them to the particle system. Using the wind for turbulence and some basic values with the vortex, you can create a raging tornado, which you can animate via the 2D plane you've already created. From here you can build volumetrics on top of the particles or set up some facing particles or geometry/debris to give the twister the exact look you want.

>> ALLAN MCKAY

Texture-based emission

REQUIRES: 3DS MAX

Here's a useful technique for *3ds max*. By using the Volume Selection modifier, you can select a black and white or greyscale image in the 'texture' slot and tell Volume Select to select vertices. Then set up your PArray or other type of particle system and tell it to emit from vertices and only from the selection. Now, as long as you've got a dense enough mesh, you'll be able to emit particles based on the image applied to your object. You can shift the UV map gizmo around to adjust the position from which it emits; this can be useful for creating foot prints or many other thousands of techniques.

>> ALLAN MCKAY

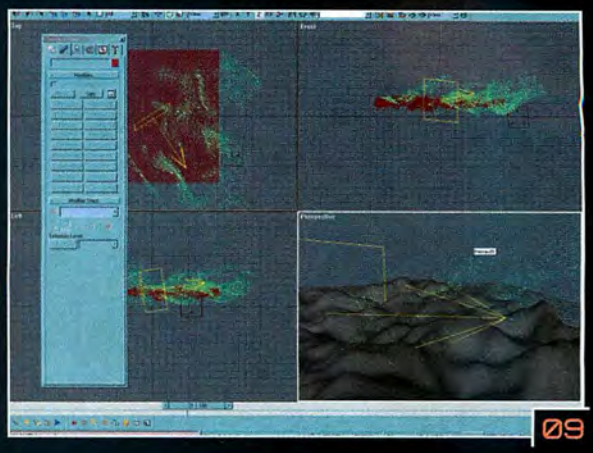
KEY TO IMAGES

04 SWARMING
Creating a bee swarm, or any other swarm, is easier if you set up the particles and other objects properly first. Your swarm's behaviour is then much easier to tweak and tune.

05/06/07 SAVE ALL
By using the LScript Commander in *LightWave 7.5*, you can set up one button that will save your scene, objects and everything else with a simple click.

08 TWISTER
Tornados and whirlwinds are a classic application of a particle system, and it's simple to create them within *3ds max* if you know how.

09 FLYING PARTICLES
In *3ds max*, it's fairly simple to use a texture to control where particles should be emitted, leading to some interesting possibilities.



09

Add imperfections

REQUIRES: CINEMA 4D

Plugins such as FiZZ, TDEM and Thinking Particles improve the particle system found in *Cinema 4D XL6, 7* and *R8* significantly, but for many artists the standard particle system remains sufficient.

One of the particle modifiers is the Deflector object. The default settings for this simple collision detection aren't suitable for most surfaces. First of all, you'll probably want to reduce the elasticity value to 30%, giving a more natural bounce when gravity is used in the scene.

Another important area that needs to be fixed is the perfect behaviour that the particles display, often following a steady set path. To roughen up their motion, you should try adding a very thin layer of Turbulence across the top of the Deflector. Now you can crank up the strength to 30-50 – this will cause all particles to vary their trajectory slightly as they appear to collide with the deflector.

>> "MASH" (MATTHEW O'NEILL)

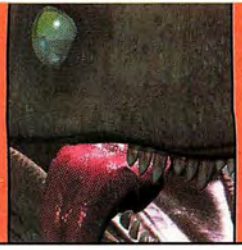
Variation adds realism

REQUIRES: CINEMA 4D

Variation can add extra realism whenever you're using wind in your particle system. You should avoid keeping it at a constant rate as this is what can give it away as being CG. Using the parameter track of the Wind modifier, animate the Wind Speed over time so that it never remains constant. Sudden gusts which die down quickly can help to focus the viewer's attention on an area of the screen where an important event is about to happen.

To push this even further, try building up and animating a whole set of particle modifiers around the physical structure of the scene and the events that happen. For example, a Rotation deformer could fade into life and then back out again to create a small vortex of leaves as a vehicle passes. Or maybe try gently moving some dust around a room as someone enters through a door.

>> "MASH" (MATTHEW O'NEILL)



CHARACTER RIGGING IN SOFTIMAGE|XSI

For its latest commercial, Jellyfish Pictures was given just two weeks to come up with two fighting, headbanging dinosaurs. Here's how they were modelled and rigged

BY PHIL DOBREE

For our latest project [the recent 30-second ad *Rock Monsters* for the Universal Music TV], we could only afford to have two people working on the job at any one time. So we had to set up use the simplest rigging and most efficient models. Using *XSI's* subdivisional modelling tools, we were able to quickly model a raptor and T-Rex using animation-friendly models as templates. The density of the template models meant that enveloping and weighting would be extremely time-consuming, so we decided that it would be quicker for us to remodel around them using Sub-Ds [Sub-Division Surfaces], which would allow us to weight the hull of the model, a relatively easy task due to the very low number of points involved. The templates provided all the proportions and the anatomy of the character, which is often the most time consuming aspect of modelling.

Meanwhile, we had to set up a skeleton and rig. There was no need for any expressions, except on the tails, which would benefit from a single puppet to operate the swishing motion required. Again, the smaller the number of animatable objects on the model, the better. Controlling most of the skeleton with a limited number of puppets would mean a fast and easy way to animate it and to make changes.

The principle here was to use as few function curves as possible. This required good planning: we had to be aware of exactly what we wanted our characters to perform before we could set them up. There's no point adding superfluous expressions and puppets when your time is extremely limited. In the long run they could also slow down the animation process.

ON THE CD
Full-sized images for the tutorial and The full Rock Monsters film

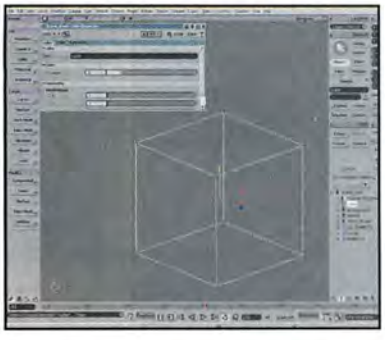
BY: PHIL DOBREE **WEB:** WWW.JELLYFISHPICTURES.CO.UK
Phil Dobree was animator on Rock Monsters (along with Christian Cheshire, Maren Juell Kristensen, and William Rockall). You can see the ad on our CD.

Quick tips

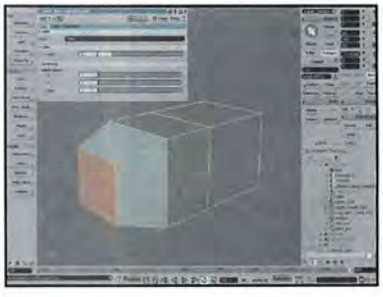
01 If you can buy or otherwise obtain a basic model from the Web or a library that gives you the proportions accurately, this will serve as a useful template that will dramatically speed up your modelling process. The beauty of modelling in Sub-Ds is the ability to easily res down the model and speed up the animation process.

02 Create a group and give it an appropriate name such as 'subdees'. If you put all your subdivisional models in this group and get geometry approximation for it, then you have a separate geometry approximation for all your Sub-Ds. You can then switch all your Sub-Ds up and down in one go.

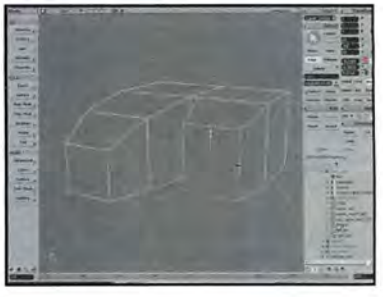
SUBDIVISIONAL MODELLING Begin by importing or making a new model



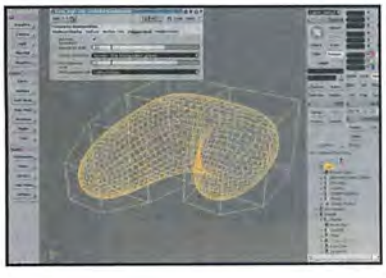
1 The first step is to model the dinosaurs. Subdivisional modelling is quick, accurate, and flexible for animation. In the software package of your choice, in our case *Softimage|XSI*, make a primitive polygonal cube. This is often a good starting point for any subdivisional modelling.



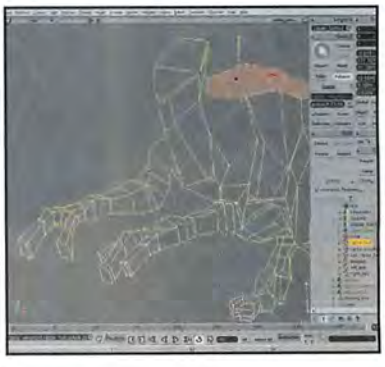
2 In polygon mode, select the polygon you wish to duplicate and transform it with Raycasting ([F10]), Freeform ([F9]), Lasso ([F8]), Rectangle ([F7]), or Paint ([F11]). The Raycasting tool is normally the quickest. Once the polygon is selected (highlighted in red) press [Ctrl] + [D] to duplicate the polygon and translate, scale, and rotate it in the relevant axis to start modelling.



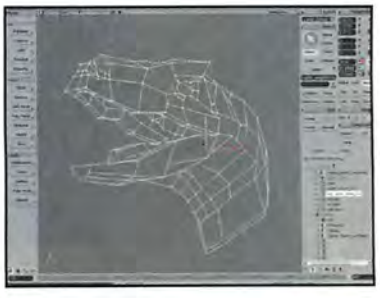
3 Select polygons or edges around the cube in the same way to start to form the shape you need. In this case, we are starting on the foot. It's a good idea to use either a template model or an accurate drawing to help get the proportions correct. If you can obtain a model that already has the correct proportions, this will help to speed up the task considerably.



4 As you model the shape from the cube (called the hull in *XSI*) at intervals, it's a good idea to subdivide the hull to see how the model is taking shape. In *XSI* it's better to create a separate Sub-D object while modelling, but once you're happy with it, subdivide the actual hull. Select the hull in object mode and go to Create > Poly Mesh > Subdivision. In the property editor, increase the slider subdivision level to an accurate setting.

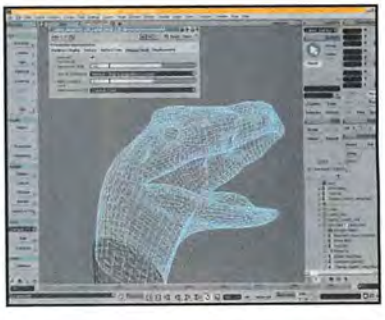


5 At this stage it's often easier to keep the subdivision object hidden while you continue to model, until you want to see further progress. In *XSI* the subdivision level can be toggled up and down using [+] and [–].



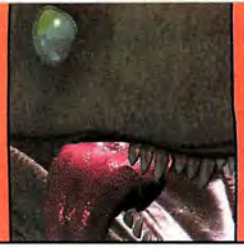
6 We made the head of the raptor separately to double the rate at which we could work. As the head was going to be more detailed, it also made sense to have this as a separate object, allowing us to increase the resolution and detail without the whole raptor being affected. In any case, the join between the two parts will be hidden by a studded dog collar.

7 Once you're happy with the final hulls of the objects, merge and unhide both objects, and ensure that they fit together at the edges and that they are in proportion. At this point you may want to create a new group and put all your Sub-D models into it. If you create a new geometry approximation property for the group, you will be able to increase or decrease all the subdivisions in your scene quickly.



8 Unhide the subdivision object and make the necessary adjustments on the hulls to finesse the model and make the joins as seamless as possible. When you're happy with the model, it's a good idea to freeze the history of the object – if you don't you'll be animating an extremely cumbersome dinosaur.

9 Separate models were created for objects such as the teeth, claws, tongue, collar, and eyes. Model these in the same way, keeping the main body unhidden to fit and proportion the models. Once you're happy with the final model, create a subdivision from the actual hull. With the hull selected, choose Get > Property > Geometry approximation, and in the Property editor, go to Polygon mesh and increase the subdivision level. Parent up the models to create a single, selectable object, then name it.

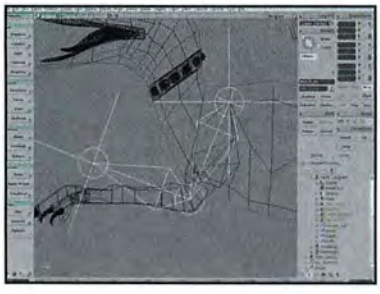


Quick tips

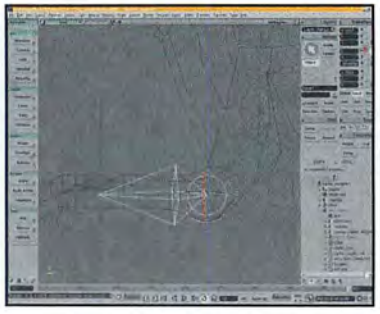
Make all the left and right puppets two different colours, and ensure that the puppets that move in XYZ can be seen in XYZ – that is, don't make them two-dimensional objects. This will make it easy to select and animate them.

Make anything that you're not animating, such as the skeleton and the geometry, unselectable. Only have the puppets selectable – placing them in a separate layers will provide a quick way to turn off and on the selectability of either.

CHARACTER RIGGING The knee bone's connected to the thigh bone...

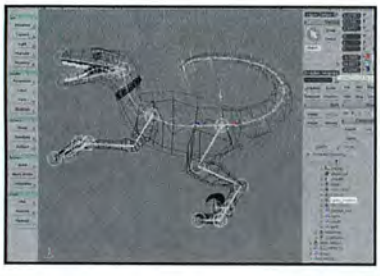


10 In animate mode, draw a skeleton for the raptor. It's always a good idea to study actual skeletons of the creatures you're rigging. If possible, try to study or have in mind the type of movement they will make. Where you place and how you place the skeleton will naturally be crucial to its movement.

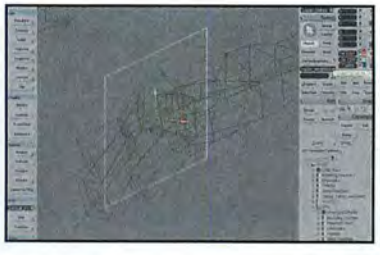


11 In *XSI* you can make later adjustments to the skeleton after you have drawn it by rotating and scaling the bones to position them correctly inside the model. Make sure the bones rotate correctly when you pull the end of the chain around.

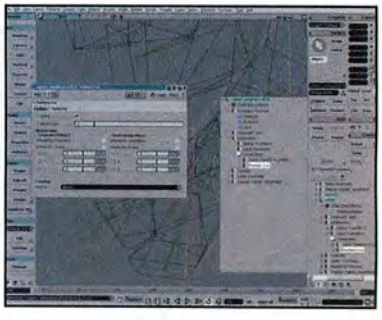
12 The hull vertices must be positioned after each bone to flex correctly. Once you've created all the chains you need for the different parts of the body, parent the effectors to the roots of the relevant bones. For example, parent the effector of the leg to the root of each toe, and the root of the jaws to the effector of the neck.



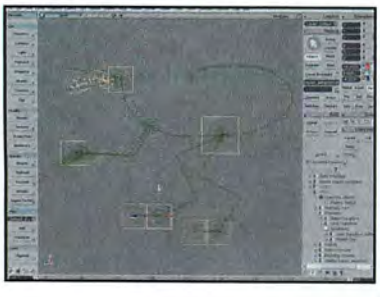
13 Add separate chains for the legs, each toe, the base of the tail to the top of the neck, each jaw, a chain for the tongue, and from the base to the tip of the tail. (We'll come to the tail later.) The skeleton for these objects was deliberately simple. We needed to animate quickly with a minimum of f-curves. You can see this set-up in more detail by viewing the full-size screenshots for this tutorial on the cover CD.



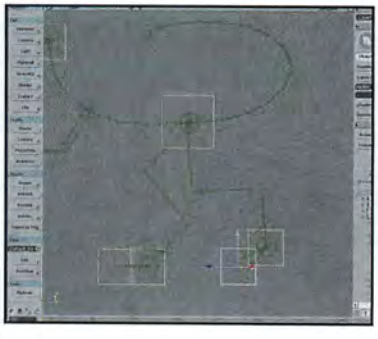
14 The next step is to create a rig using puppets to simplify the animation process. Get primitive shapes as puppets ensuring that they don't render, either by selecting curves or by switching primary rays off the objects. In this case we've selected a square. Constrain the square (positionally) to the effector of the leg to place it accurately and then release the constraint and reverse. When you move the square, the leg should move with it.



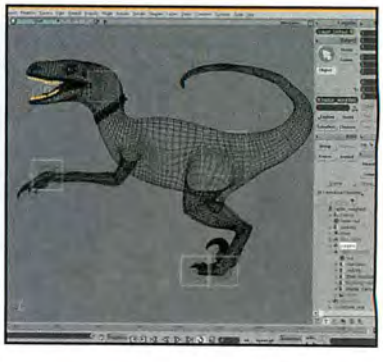
15 Constrain it both directionally and positionally so that when you rotate the puppet the chain rotates. In *XSI* the constraints property editor allows a great deal of flexibility with damping and positioning. Experiment with these if you don't want 100% constraint, but in most cases you'll want it set to full.



16 Place similar puppets at the base of the tail/root of the spine, on the ends of the arms, at the root of the jaw/end of the spine, and at the tips of each toe. Parent these to the base of the leg so that pressing the middle mouse button selects the whole foot. This gives you a very simple and flexible rig – with just six main puppets to animate and create the movements you need.



17 Experiment by moving the puppet, but don't keyframe the skeleton itself. Be sure to create/keyframe a default pose at frame 0 or –1 so that you can always go back if necessary. The puppet at the base of the spine should provide the gravity and flex keeping the feet locked to the ground, once they've been keyed.



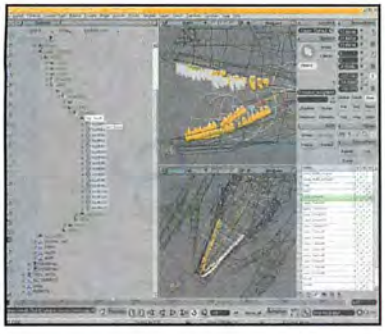
18 The next step is to envelope the model to the skeleton. This is when the power of subdivisional modelling starts to pay off. By enveloping and weighting on the low-res hull you save huge amounts of time and hassle. Be sure to weight in the default pose.

Quick tips

05 **Turn down the hull to minimum when weighting. You want to weight as few vertices as possible.**

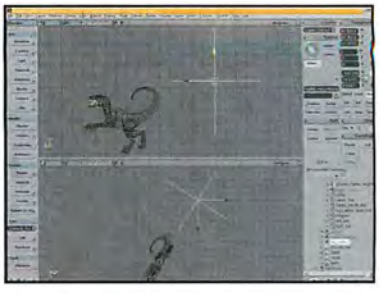
06 **It's easier (but not as we've done here) to have a tail straight out horizontally as the default position rather than curved.**

CHARACTER RIGGING Puppets, parents, and trial and error



19 It's a good idea to parent the teeth separately to the top and bottom bones in the jaw skeleton, ensuring that they aren't part of the envelope – they would naturally be part of the bone in a skull.

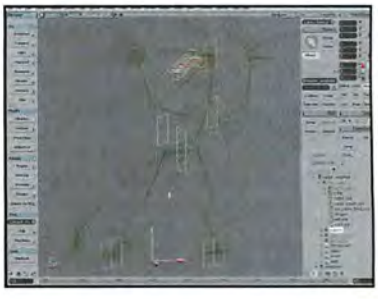
20 The tail is the one area where it's certainly worth setting up a simple expression. The tail needs a swishing movement in any direction without the laborious task of selecting each bone in the chain with the resultant multiple f-curves.



21 Get a primitive object such as a null (useful in this case because it's visible in any view) to use as the puppet for the tail. The idea is to have an additive effect of the rotation of the chain on the translation of the puppet. By translating the puppet in Y, the chain will rotate additively around Z.

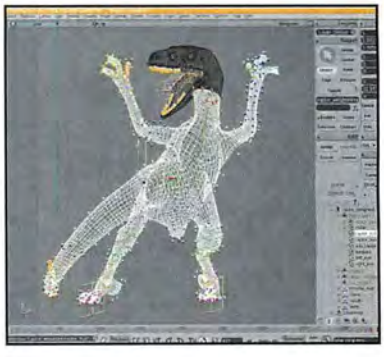
22 Select the first bone and open its kinematic property editor (or press [Ctrl] + [K]). Lock the window and do the same for the null. Drag and drop the Y translation kinematic of the null onto the Z rotation of the bone. This now shows an expression icon – right click it and select the expression editor. You will need to multiply the Y translation of the null (dependant on the size of your model – in our case 2.5) to get the desired effect.

23 Once this is done, you may not need to multiply the next bone by anything – bear in mind that the effect should be additive. To get a circular movement, do the same for the X translation of the null and Y rotation of the chains.



24 It's a good idea to animate the puppets before proceeding further to check that you can get the skeleton to move into the types of positions you need. Keep the mesh hidden to speed up the process. Keyframe the most extreme positions the model is likely to make and create some simple animations. Keep the mesh hidden to speed up the process.

25 Unhide the hull and run a test hardware render. This will give a good idea of how your model is bearing up to the strain of the extreme movements. Don't worry about textures and lighting.



26 Take this a step further by turning up the subdivisional model and checking for nasty unsightly folds and creases in the model. If these appear, you'll need to adjust the weighting, and – if you're really unlucky – you may need to alter the skeleton as well.

27 *Once you've done a hardware* render, the next step is to render a full resolution test with all the trimmings. Increase the resolution of the model and do a full-res render overnight to check everything is working as expected. Et voilà: Rock Monsters! ■

TRADE SECRETS
REFLECTING THE REAL WORLD

How can you make a CG object look more photorealistic? Answer: by reflecting a live-action scene onto its surface. In this tutorial, we'll show you how to do so **BY ALEX LINDSAY**

Most of the time, animators create entirely virtual environments. These are, of course, the easiest to control. Everything is lit the same way, raytracing will handle all the reflections, and all is good. But what if you don't have that luxury? What if most of the scene you have to create is live action? In most visual effects work, this is more often the case. You have a big set and a few small objects to add to it. So how do you get the lighting and reflections correct? You will quickly find that basic CG lights are a far cry from the real world and that those squiggly reflection maps you downloaded from the Web look... well, not so good.

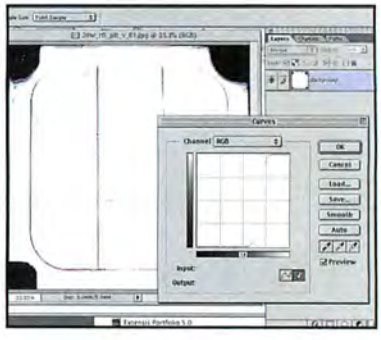
This is tutorial is about what comes next. The key to capture what you have on the set, as fast as possible, and reflect that back on to the object. To do this, you need to capture the background, the surface the object is sitting on, and the area surrounding the object. Once this is achieved, you simply apply the images to primitives in your scene, *et voilá*! You have the beginnings of a truly synchronised environment.

Alex Lindsay is a regular contributor to *3D World* and has worked in the 3D industry for many years, including a stint at ILM. You can find out more about Alex on his website, www.dvgarage.com, along with many more of his tutorials

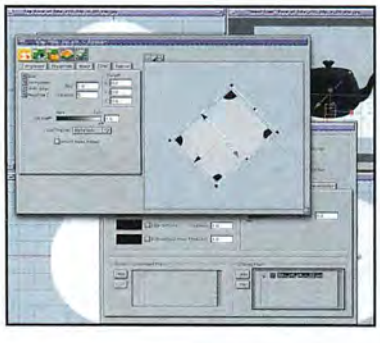
Nikon and HDR

As a 3D animator matching live-action scenes, one of the best investments you can make is to buy a camera package similar to the one shown in this article. This little setup allows you to capture key information about a set and add truly realistic lighting and reflection models to your scene. In the near future (if you haven't gone there already), you'll want to be using HDR domes for truly high-quality lighting projects. Working with this setup in that environment is pretty easy – especially when compared to stitching five exposures of 50 images each together to create a spherical panorama! There are even a few hacks that promise to allow you to control your Nikon with a Palm Pilot, making precise, multiple exposures much easier.

1 Shoot background plate The first step is to shoot the plate you will use for the background for your image. Make sure to frame the shot as if your virtual object were present.

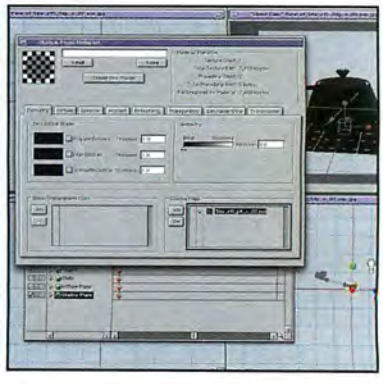


5 Create Alpha channel for platform With the Curves Dialog in *Photoshop*, you can increase the contrast in just the right areas to separate the grass in the corners of the image from the base. A little cleaning up is necessary, but it shouldn't take more than five minutes to complete. This will create a proper Clip Map later.



9 Add texture to plane Add the platform texture to the Luminence channel of the plane. This will properly reflect the real-world surface onto the object. Add the Alpha channel to the Clipping channel to cut off the edges at render. Again, make sure the plane is set to Reflection Object Only. We still don't need it to render.

10 Add texture to globe Add the panorama to the sphere. For this process, you can simply flatmap the image from the top and get most of what you're looking for. Add this to the Luminence channel, as you don't want it to shade at all.



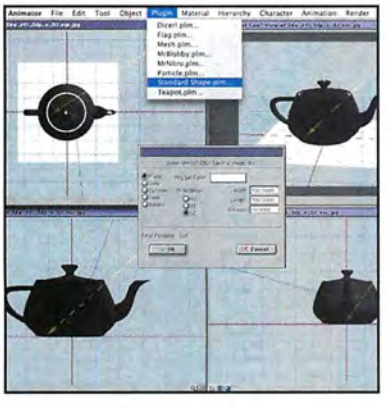
11 Duplicate plane and remove texture Duplicate the plane and remove the colour texture. Set the plane to black and move the plane up .01 in the Y axis. You just want to make sure it's above the plane it was copied from.

2 Shoot platform base Shoot the platform orthographically. You're going to use this as a texture for the plane that sits below your CG object. Try to shoot the image as straight as possible, using a tripod if you can.

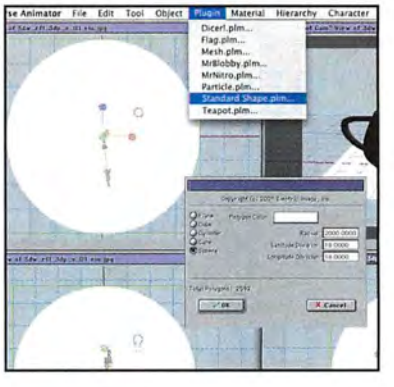
3 Shoot panorama This is best done with a camera with a 180-degree lens. I used a Nikon 4500 camera ($699) and an FC-E8 Lens ($200). It makes taking pictures like this simple.

4 Crop panorama Of course, the dome is a round image in a rectangular format. You need to crop the image so that the dome is full frame in both horizontal and vertical directions. This will make the texture mapping easier in your 3D application of choice.

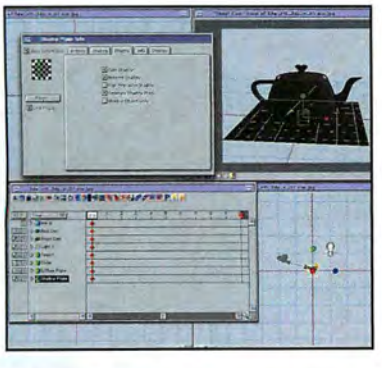
6 Add teapot In *Universe* (there's a demo of version 5.0 on the CD, or try the 3D Toolkit version), add the Teapot plugin. Of course, you could add any CG object, from any 3D package.



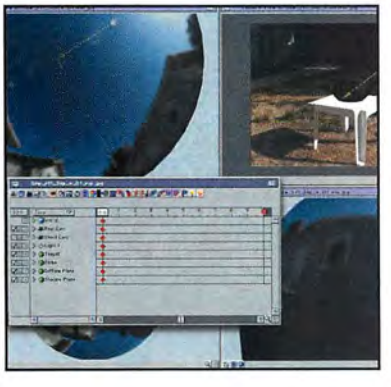
7 Add base plane Add a base plane. This plane will simulate the size of the base below the teapot. Try to scale it so as to keep it roughly proportional to the object.



8 Add globe Add a large sphere to act as the global reflection. Make sure it's large enough to be out of the way and centred about the teapot. Make sure the plane is set to Reflection Object Only. We don't need it to render, just reflect.



12 Set plane to Shadow Mask and reduce Opacity Set the plane to Generate Shadow Mask. This will cause the plane to only render where the shadows are located. Reduce the opacity to match the density of the surrounding shadows.

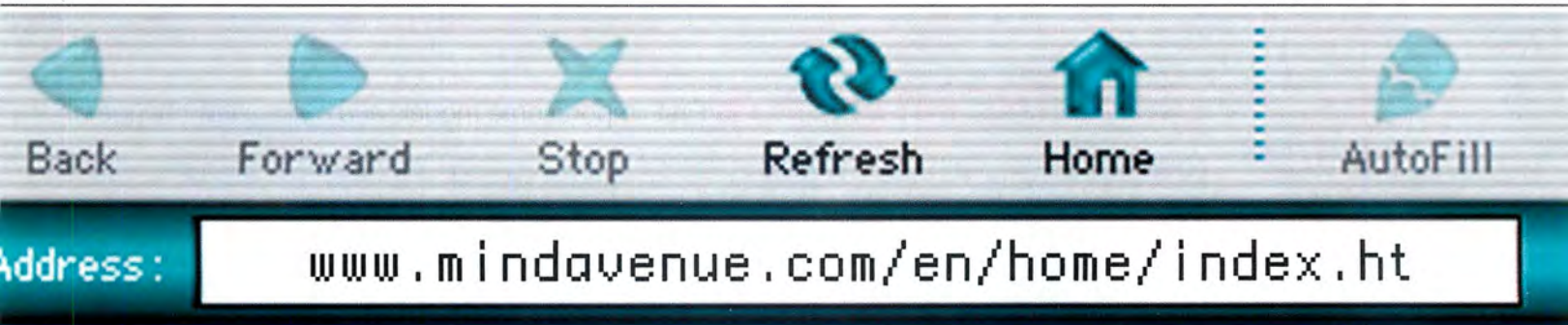


13 Position light You can use the texture on the globe to get a good idea of where the light belongs. Once the light is in position, move the camera until the plane appears to be on top of the platform.

14 Render Now render out! Of course, to get your image looking *really* realistic, you still need to add grunge maps, render out the diffuse, specular, and shadow separately, bring everything into a compositor and soften the CG element – but that's another story... ■

3D TOOLKIT

Of course, this is just the beginning. To learn more about creating photorealistic objects and real-world reflections, visit www.dvgarage.com/*lab.php*. *You'll find a host* of tutorials that walk you through the key techniques you need to know about as a visual effects artist.



ON THE CD
AXEL 1.0 (full product)
AXELedge 1.5 (demo version)

WEB 3D IN AXEL

3D on the Web is coming alive. Get up to speed with *AXEL 1.0* from this month's cover CD

BY MICK GARNER AND JASON JAMES

This is probably one of the hardest tutorials we have ever had to write. In Web magazines we are seen as cutting-edge designers, offering new levels of fun and entertainment to the masses. However, to the 3D world we are a nightmare: we have too many limitations – our designs look blocky and basic in comparison to the norm, and fluid motion escapes us. But before you move on to the next 'real' 3D article, do spend a few moments having a look at our tutorial. 3D on the Web is gathering momentum – and if the field wasn't a serious contender for the future of 3D design, why would all of the top software developers be releasing plugins and standalone packages to enable their applications to be used for this purpose?

We've created this tutorial using MindAvenue's *AXEL 1.0*. This was the first release of *AXEL* (currently on version 1.5, a demo of which can also be found on the cover CD) so what you are looking at is the level of 3D Web design from over a year ago. Models and interactions are created using icons and drop-down menus in the same way as most other 3D design packages. We've created something that should appear quite classical in its look, using old-style animation design and a pastel palette. We'll also give you a taste of some of the latest visualisation techniques in *AXELedge 1.5*, including built-in cartoon and wireframe renderers. After this tutorial, we're sure you'll agree that Web 3D is definitely an area to watch.

BY: MICK GARNER
EMAIL: MICKGARNER@MAVERICK3D.CO.UK
BY: JASON JAMES
EMAIL: JASONJAMES@VISUALVIBEPRODUCTIONS.CO.UK

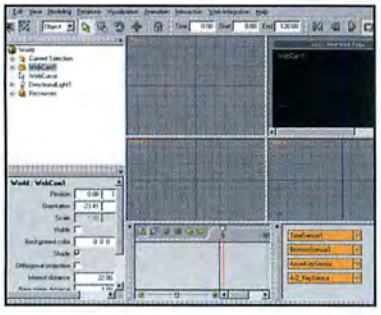
Mick and Jason have just set up their own companies so that they can merge their 2D design styles with 3D for the Web. They start their first major commission in January. They have recently been doing articles for *Computer Arts* and *Computer Arts Special* as well as speaking at the Digital Arts World show in London

TUTORIAL

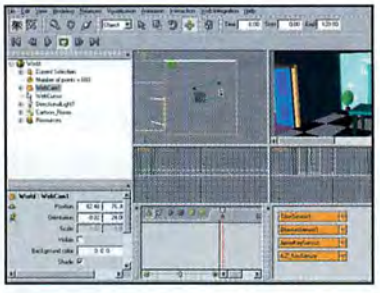
Geometry and download times

Since download time is always crucial, remember that any surface you create (sphere, cube, plane, etc.) will be lightning fast. This is because the only information that has to be transferred is the parameters of the object, such as radius, size, and subdivisions. Once you edit one or more points on that surface, it becomes many points in space, and therefore takes longer to download.

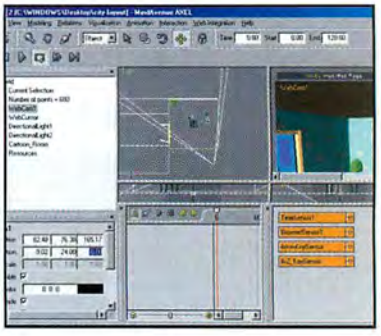
USING THE INTERFACE First, import some models and make a few changes



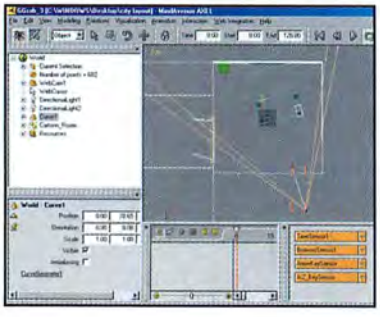
1 Install and open *AXEL 1.0* from the CD. Before you start, spend a few moments familiarising yourself with the *AXEL* interface: look at the World explorer, Animation Sequencer, Interaction Editor, and Parameter Editor. A few moments of exploration will help you with the following tutorial.



2 Now that you're familiar with the *AXEL* interface, you need to import a model. To do this go to File > Merge > AXEL project, locate the Cartoon_Room file found on the CD in the Merges folder within the Games Room folder. If you look in the World explorer, you'll notice that there are two Webcam 1 icons. Delete the highlighted Webcam.

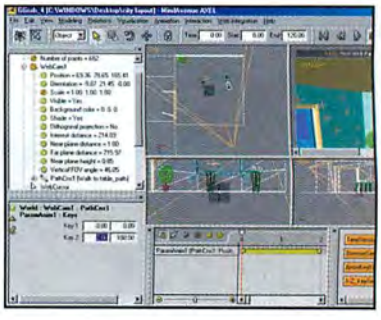


3 Now select Webcam 1, then go to the Parameter Editor and make the following changes: Position: 82.48, 76.38, 165.17; Orientation: -9.02, 24.0, -0.00. To see the full room in Webcam 1 view, right click the Webcam 1 window and select Single view.

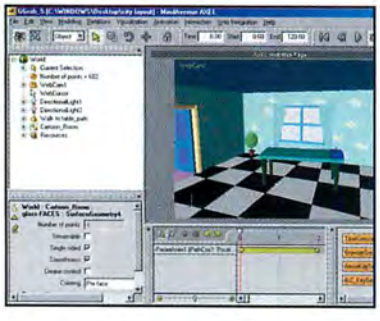


4 We are now going to create an animation path for the Webcam. Select the Top viewport and right click to enable Single view. To view Webcam 1 turn its visibility on in the World explorer. Using the Zoom icon, zoom out until both the table and the Webcam are in view. Then go to Modelling > Draw curve.

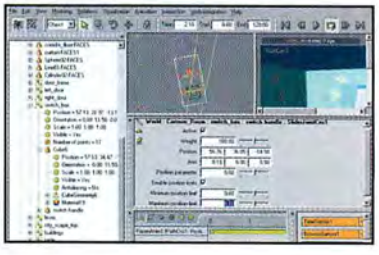
5 Draw a line from the camera to the table. Then select Curve 1 in the World explorer. Go to the Parameter Editor > Curve geometry > Point positions. Set the point positions to the following. Position1: 69.36, 0.00, 171.92. Position2: 43.42, 0.00, 94.52. Now multi-select Webcam 1 and Curve 1 then go to Animation > Path Animation.



6 Now select Webcam 1 in the World explorer and drop down to see its settings. Select PathCns1 (curve1). Then in the Parameter Editor select ParamAnim1 > Keys, and set the following: Key 1: 0.00, 0.00; Key 2: 2.00, 0.00. Then in the World explorer, minimise Webcam 1, and rename Curve 1 to Walk to table_path.



7 Test the animation by going to the Animation Sequencer and pressing the Play icon. Now select the ceiling and change its colour. To do this, go to the World explorer and select Cartoon_Room > main_ceiling-FACES > Visualisation > Add material. Set the following RGB values: 113, 183, 253.



8 Double click Cartoon_Room > switch_box > switch handle and add a colour material with an RGB value of: 255, 128, 0.00. Now create a slider joint constraint for the switch. Select the Lock icon. In the World explorer, multi-select the switch handle and Cube 6, in that order. Then in Relations > Joint constraints > Slider in the Parameter Editor, set: Position: 56.76, 36.05, -14.98. Axis: 0.19, 0.00, 0.98. Minimum Position Limit: 0.00. Maximum Position Limit: 6.00. Now deselect the Lock icon.

9 Next add an *interactive* handle to the switch handle. Select the switch handle, then Interaction > Handles > Translate. Now add a reaction – this will be triggered by an arrow key sensor. Select the ParamAnim1 in the Animation Sequencer, then go to Interaction > Reactions > Play Animation. The animation has now been added to the Interaction Editor. Drag a link from the Play Animation reaction white tab to the OnKeyPress: Up located in the ArrowKeySensor drop-down menu. Preview by pressing the Browse icon in the top left of the screen.

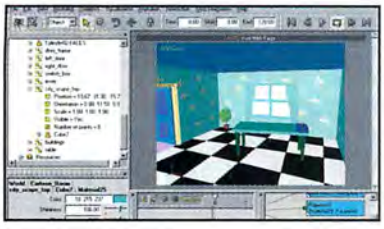
Slicing and dicing AXEL objects

You can subdivide an area of a surface by selecting points and choosing *Model* > *Modify Surface* > *Subdivide*. This will subdivide only the faces made from the points you selected, rather than subdivide the whole surface. Subdividing is crucial, for everything from giving you more points and faces to model from, to adding edges to objects so that deformations like Pushes and Bends are smoother.

Naming groups with capitals

When you rename a new group, use capitals only. This will help to visually separate the Group category from other elements of the Project Manager.

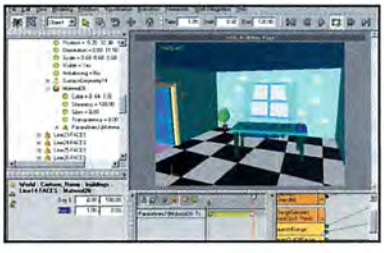
SETTING THE SCENE Now, set up the cityscape and add colour and animation



10 Drop down city_scape_top in the World explorer, and turn on the visibility in the Parameter Editor. Now apply a colour material to this: RGB 18, 215, 237. Roll out Cube 7 and select its material. In the Parameter Editor, select transparency and change it to 100. In the Animation Sequencer, set the slider to 0, and click the Record button to set a key frame. Then move the slider to 1, and change the transparency to 0. Select ParamAnim2 and create an animation reaction as done previously with the path animation.

11 Select the switch_box menu, then switch handle > SliderJointCns1. Select Position on the slider parameter and change it to 6.00. Then Interaction > Sensors > Parameter Range. Go to the Interaction Editor and link PlayAnim2 to OnParamInRange of ParamRangeSensor1. Select city_scape_top, set to Visible=Yes. Go to Interaction > Reactions > Set Parameter. Set a Visible=No parameter for the city_scape_top. Now set visibility to Yes then link SetParam3 to on On ParamInRange, and SetParam2 to ParamOutofRange in the Interaction Editor.

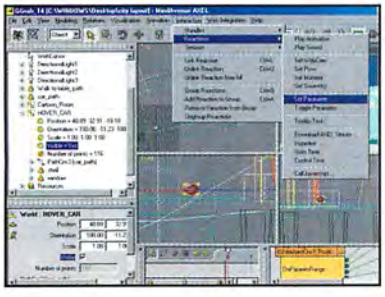
12 In the World explorer select Cartoon_Room > buildings. Open this to view the individual faces that create the buildings. Select Line14-FACES, then Visualisation > Add Material. Set RGB value to: 0, 64, 128. Then multi-select the material and the remaining faces > Visualisation > Link Material. Then in the World explorer select Line14-FACES > Surface Geometry > Colouring=per point. In the Parameter Editor change Colouring=per point to Colouring= none. Repeat this for all remaining faces.

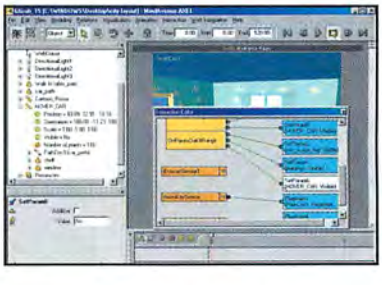


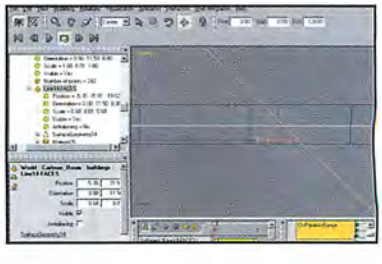
13 We are now going to animate their transparency, so that they fade up just after city_scape_top appears. In the World explorer select Line14-FACES > Material > Transparency. In the Parameter Editor change the Transparency to 100. Then in the Animation Sequencer set a key frame at 0. Move the slider to 1. Then in the Parameter Editor set the Transparency to 0. Now set this animation as a Play Animation reaction as described in step 9.

14 In the Interaction Editor, link this to OnParamInRange of ParamRangeSensor1. Then click the trigger (the white circles) of PlayAnim3 and set Time delay to 1.00. Now select buildings in World explorer and turn their visibility off, then go to Interaction > Reactions > Set Param. Link this to OnParamInRange of ParamRangeSensor1. Turn visibility back on in the World explorer and create a parameter reaction for this, then link it to OnParamOutOfRange.

15 Next we will merge the HOVER_CAR, CAR_CAM and car_path. To do this go to File > Merge > AXEL project, and locate the Games Room folder > Merges > HOVER_CAR on the CD. When merged, you will notice that there's an animation parameter in the Animation Sequencer. This is the animation path for the car.







16 We now need to create a Play Animation reaction for the car path. To do this use the same techniques you learnt in step 9. We will later set up a button to trigger this animation. Now go into the World explorer and select the HOVER_CAR group and drop down to see the settings. Select Visible > Interactions > Reactions > Set Param. Now turn visibility off.

17 The visibility of the car and buildings is controlled by the switch handle. To set this, go into the Interaction Editor and link HOVER_CAR visibility ON to OnParamInRange of ParamRangeSensor1. Then go back to World explorer and select HOVER_CAR visibility NO > Interaction > Reactions > Set Param. When you've done this, link this to OnParamOutOfRange of ParamRangeSensor1.

18 Go to World explorer and drop down the buildings group to view the faces that create the buildings. We want them to scale up from the bottom of the face. To do this go into the Right viewport > *right click* > *Single* view. Now select Line14-FACES. Then change object to centre in the toolbar. Now in the Right viewport zoom into the face's centre point and then with the Translate tool place the centre point at the base of the face. Repeat these steps for the remaining faces.

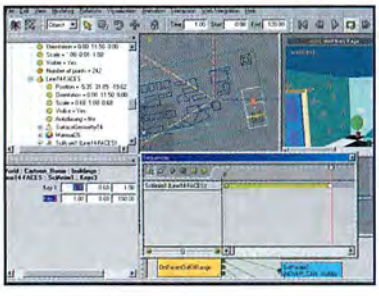
Use gradients for effective backgrounds

An interesting alternative to a texture for your background is to use a plane with a colour gradient. Get a vertical plane, and limit its subdivisions to 1 x 1 in PlaneGeometry. Apply a material, then multi-select the top or bottom row of points and choose Visualise > Edit Point colour and choose a different colour.

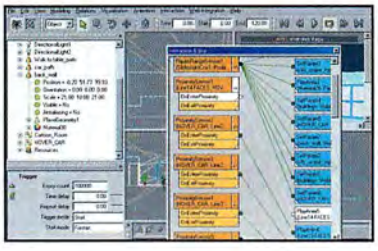
Tricks of the URL trade

While you can only Publish as URL for Movies, you can, in fact, save large textures, or sounds, or any *QuickTime* compatible file as a MOV, then use this file as a movie and Publish as URL. This way, these other files can also be located remotely on the Internet and stream into your *AXEL* project as if they were movies.

ANIMATE YOUR PROJECT Time to finish your scene and preview it

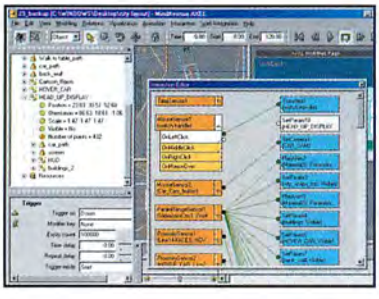


19 We are now ready to animate. Select Line14-FACES > Scale, then go to the Animation Sequencer and set a key frame at 0. Then move the slider to 1, and set the scale to 1 in the Parameter Editor. This has now created the second key. Repeat these steps for all the remaining faces. If you want to, you can alter the scale sizes to make the buildings more varied.

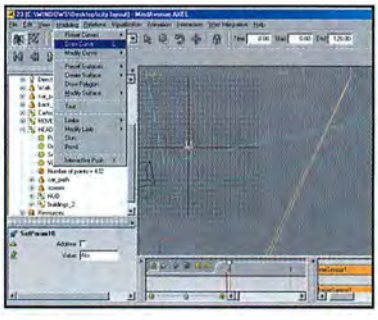


20 We are now going to trigger the animations as the car passes each building. In the World explorer multi-select Line14-FACES and HOVER_CAR group > Interaction > Sensors > Proximity. Now create a Play Animation reaction for the 14-FACES scale in the Animation Sequencer. Go to the Interaction Editor and link the Play Animation reaction to OnEnterProximity of ProximitySensor1. Repeat these steps to add proximity sensors to remaining scale animations.

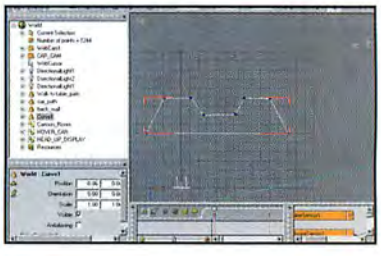
21 Now we are to merge the HEAD_UP_DISPLAY, which will control the camera view option and contain a working map of the city. Go to File > Merge > AXEL project > Games Room folder > Merges > HEAD_UP_DISPLAY. We now need to link the merged reactions to the sensors. Go into the Interaction Editor and link the following: PlayAnim4 to OnKeyPressDown of ArrowKeySensor; SetParam5 to OnParamInRange of ParamRangeSensor1.



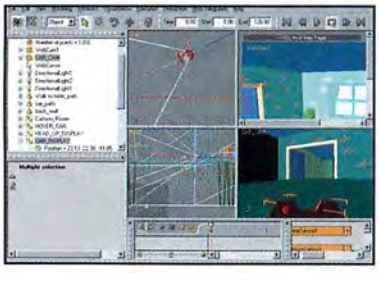
22 Now we will turn the HEAD_UP_DISPLAY visibility off when the camera change has been activated. In the World explorer select HEAD_UP_DISPLAY, select its visibility and turn it off. Then go to Interaction > Reactions > Set Parameter. Link this reaction to OnLeftClick of MouseSensor1 in the Interaction Editor.



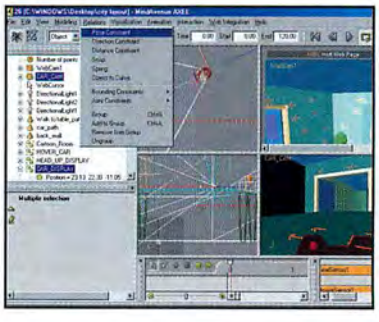
23 What you need to do now is create an in-car button, which will enable you to switch back to the Webcam 1 view. The button will be placed on a control panel within the car. So this is what you will create first. Go to Modelling > Draw Curve, then right click the Top viewport and select Single view.



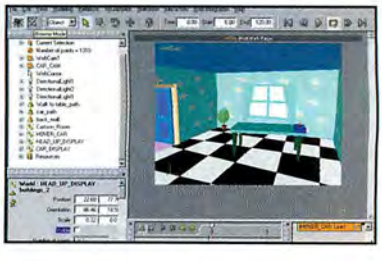
24 Now create a shape that looks like the illustration above. Then go to Modelling > Create Surface > Extrusion from curve. In the World explorer, select Curve 1 and delete it. Now rename Extrusion 1 to In_Car_Display, and in the Parameter Editor set these coordinates: Position: 33.84, 32.34, -15.69; Orientation: -90.00, 65.00, 180.00; Scale: 0.10, 0.10, 0.10. The control panel will now be placed in the correct position.



25 The next stage is to add the button to the panel. Go to Modelling > Preset Surfaces > Sphere. Now, in the Parameter Editor set these coordinates: Position: 33.85, 33.15, -15.70; Orientation: 0.00, 0.00, 0.00; Scale: 0.07, 0.07, 0.07. Rename the sphere to Room_Cam_Button. Now, apply a material of choice to both the Room_Cam_Button and the In_Car_Display.



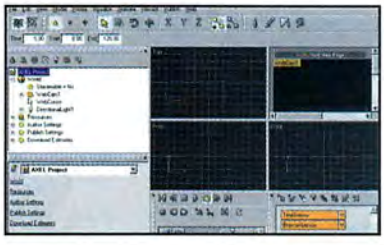
26 Now that we have applied the materials, select Room_Cam_Button, then Interaction > Sensors > Mouse. Select the Lock icon in the toolbar and then multi-select In_Car_Display and CAR_CAM > Relations > Pose Constraint. This will attach the In_Car_Display to the Webcam.



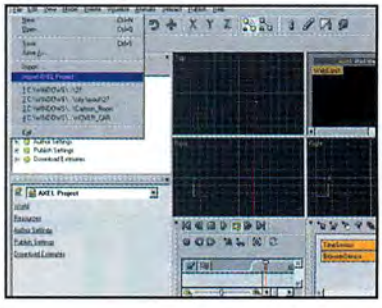
27 We will now set the Room_Cam_Button up, so that it activates Webcam 1. To do this, select CAR_DISPLAY > Room_Cam_Button > Interaction > Sensor > Mouse. Then select Webcam 1 > Reactions > Set Webcam. Now link the Set Webcam reaction to OnLeftClick of the MouseSensor, and preview your project by right clicking in the Webcam 1 viewport and selecting the Browse icon at the top left of the screen.

ADVANCED FEATURES IN AXEL 1.5

You now need to uninstall *AXEL 1.0* and load the demo version of *AXEL 1.5*. You'll notice that the interface is much more user-friendly, and that the World explorer has become the Project Manager. Let's try out some of the new features, including the wireframe renderer, cartoon renderer, and movie texture feature



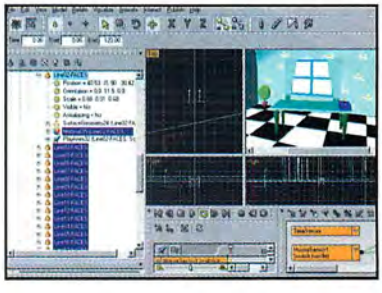
28 After you've loaded the demo version of *AXEL 1.5*, you should have a good look around and try out some of the new features. You'll be surprised at how fast you can pick it up. If you normally work with *Maya*, *3ds max*, or *Softimage*, try exporting some of your work to VRML as *AXEL* will import this. You can then add interactions to your scene; just remember the lower the poly count the better.



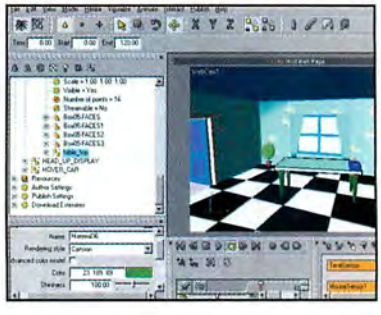
29 Now that you have become familiar with the *AXEL 1.5* interface, go to File > New. You can now import the Finished Tutorial file from the Games Room folder. You will notice that the File > Merge option is now File > Import AXEL Project.

30 We are now going to delete Directional light2 in the Project Manager, due to the high levels of light when imported. In the Project Manager select cartoon_room > drop down > window_frame-FACES > drop down > material 4. In the Parameter Editor set the Colour to RGB 38,78,117. Now the window frame has better visibility.

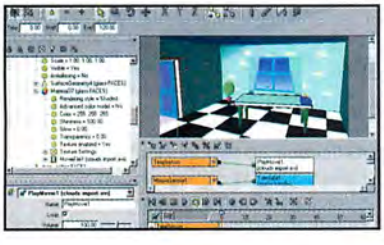
31 We will now apply a new type of material, and there are several new options. Go to Visualise > Add Colour Material. You can then select Shaded, Cartoon, or Custom Wireframe.



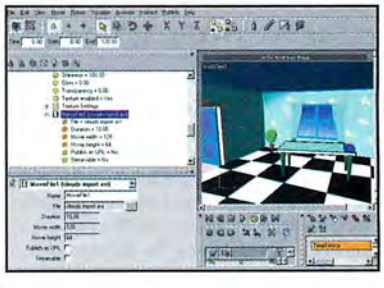
32 To apply a Custom Wireframe, go to the Project Manager > cartoon_room > buildings > Line02-FACES. Then go to Visualise > Add Colour Material > Custom Wireframe, and set the RGB to 0, 64,128. Link this new material to the remaining faces by selecting Material 35 and FACES > Visualise > Link Material.



33 Now we will apply a Cartoon shader to the table_top. Go to Project Manager > cartoon_room > table > table_top > Visualise > Add Colour Material > Cartoon. Set RGB to 23, 189, 89. If you go into the Parameter Editor, you can alter the shader settings.



34 We will now add a movie texture to the scene. To do this go to Project Manager > glass-FACES > Visualise > Add Image Texture, then locate clouds import.avi found in the Games Room folder > Textures. You'll now notice that there's a sky view showing in the window. In the Interaction Editor select the PlayMovie1 reaction, then go to the Parameter Editor and enable Loop playback.



35 The clouds import.avi file is quite big at 234kb for a background feature in a Web-based project. Using your favourite 3D design package, have a go at creating a smaller file to do the same job, then import it into your scene. Just remember the maximum texture import into *AXEL* is 512 x 512.

36 You've now set up a scene in *AXEL*. You can use what you've learnt in these steps to add different textures and materials to the scene to personalise it. You can then use the Preview in AXEL icon to test your results, and soon you could be publishing interactive 3D content for your own website. ■

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Q&A

RIGHT **Gaseous fire has a distinctive form and varying degrees of colour. Its fluid motion and yellow-to-red shading can be reproduced effectively in *3ds max***

ON THE CD
Supporting files for this Q&A

3ds max

by PETE DRAPER

QUESTION

"How can I make a gaseous fire effect appear on the ceiling in *3ds max*?"

ASHLEY HALL | via email

ANSWER

Ah... plugin-free fire. This must be one of the most frequently asked questions in CG, right after, "How can I model a head?" Like modelling a head, this is difficult to get right because we've seen so many impressive examples in big-budget Hollywood movies. We're all familiar with fire's properties, colour, and illumination, and if any one specific element is out of place with our effect then it will look laughably wrong.

Each type of fire looks and behaves differently. Wood-fuelled fires 'lick' surfaces, wrap themselves around combustible material, and spread slowly. Petrol fires, on the other hand, are coloured differently and spread very quickly.

Gaseous fires are entirely different and move in a similar *way to liquid*. One good example is the lobby explosion scene from *The Matrix*, in which a blown-out (CG) lift door passes over and through the fire before striking the camera. The special effects artist wanted to achieve a billowing effect that wrapped around the posts and flowed through the large open area. Another type of fire wouldn't have looked as good for this particular scene.

Gaseous fires aren't as bright as other types of fire and the colour changes depending on the fire's 'age'. The closer to the source of the fire we get, the more intense the brightness, and the more yellow (to white) the colour becomes. The further away we move, the more the colour changes to a red, then to a slight purple; basically, it becomes more blue as the fire absorbs more oxygen.

COME ON BABY...

The reddish hue of gas fires affects the light emitted from the ignited gas. The scene (in addition to existing lighting) should therefore be lit accordingly. Several point or direct lights should be placed over the surface of the fire facing outwards to light the environment, and some should light the fire geometry itself to add additional hot areas. These areas should include places where the fire would accumulate, such as corners of rooms, where the fire collides with additional objects, and especially where the fire is emitted, as this would be the brightest point. These placed lights would not normally illuminate a subject a million miles away, so attenuation (either designed falloff or inverse-square) should be used to reduce the light's intensity the further away from the light source the lit subject is positioned.

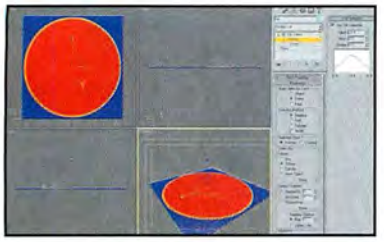
The example illustrated in this Q&A isn't animated, but converting it isn't all that taxing (an animation of the effect can be found on the cover CD). The fire geometry should be animated from its source. This should take on the form of animating the base plane's settings, not by simple scaling. Doing it this way will enable the geometry to pass over the wave displacement previously constructed. The smoke displacement will not have to be animated to show these ripples flowing out from the source because gaseous fire seems to leave the trails almost sitting there, simply billowing away. However, the smoke maps that create the displacement will have to be animated, which is a simple case of animating the phases of each map a little. The same should be applied to the Smoke maps used in the fire's material, Gradient Ramp maps (if any noise exists in the map) and in the Noise Modifier. *The type of mapping may* need to be changed or the Smoke procedural maps will just pass over the surface of the fire geometry in one direction and not be emitted outwards from the centre.

Although not covered here, this type of fire's motion should be designed as if it were liquid. Therefore, *3ds max 5's* Reactor dynamics could be put to excellent use. The fire's construction should really be geometry-based, unless you're using a third-party fluid dynamics system that can handle the materials used in this example.

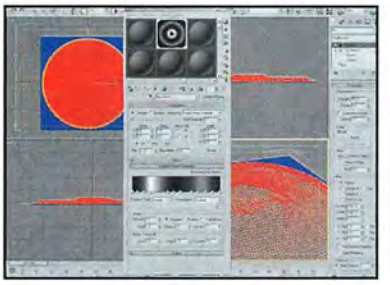
BY: PETE DRAPER WEB: WWW.XENOMORPHIC.CO.UK
Pete Draper is *3D World's* resident *3ds max* expert. He was always told off by his Mum for playing with matches

STEP BY STEP: BUILD A FIRE

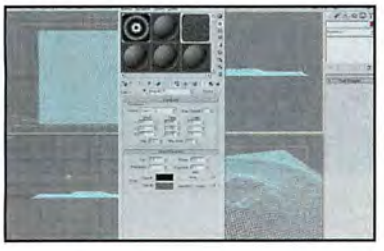
Got a burning ambition to make Hollywood-style explosions? We show you how to create a realistic fire effect



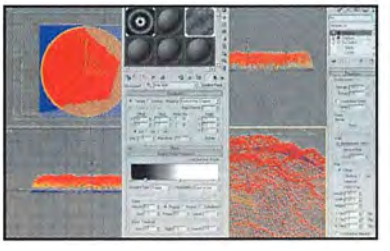
1 In a new scene, create a Plane primitive 1000 x 1000 and set the Length and Width segments to 100. Add a Volume Select Modifier, set the Stack Selection Level to Vertex, and set Select By to Sphere. Enter Gizmo Sub-Object mode and scale the Gizmo to create a disc of red vertices a few in from the edge. Turn on Soft Selection and adjust the settings to create a falloff of about 5 vertices (a setting of about 30 in the Falloff spinner).



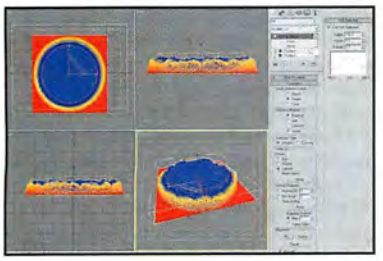
2 Add a Displace modifier: in the Materials Editor, create a new Gradient Ramp map and set its Gradient Type to Radial. Design the gradient as shown above. Drag the Gradient Ramp map to the Map slot of the Displace Modifier and set the Strength spinner to 50. Add another Displace modifier and set its strength to 200.



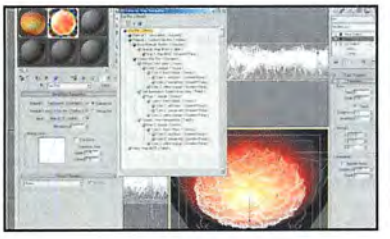
3 Create a new Mix map and assign Smoke maps to slots 1 and 2. In slot 1's smoke map, set the Source to Object XYZ, Size to 0.6, Iterations to 1, and Exponent to 0.2. Set Colour 1 to Black and add a Smoke map to Colour 2. Set this new smoke map's Size to 1.5, Iterations to 1, and Exponent to 0.2. Set Colour 1 to RGB 70,70,70 and Colour 2 to 136,136,136. This displaces the inner (emitted) part of the fire. Make the size larger if desired.



4 In the Mix map, copy the Smoke maps into slot 2. In the first Smoke map set the Size to 1 and the Exponent to 0.1. In the Smoke map in Colour 2, set the Size to 5 and colours 1 and 2 to black and RGB 195, 195, 195. At the top of the Mix map, add a Gradient Ramp map to the mix slot and amend its Gradient Type to Radial and design the gradient as illustrated. Assign this map structure to the second displacement modifier's map slot.



5 Add another Volume Select Modifier to the stack and set the Stack Selection Level to Vertex. Set the Selection Method to Replace and check on Invert. Change the Select By Volume to Cylinder. Add a Soft Selection falloff of 150. Enter Gizmo Sub-Object mode and scale the Gizmo as illustrated so the inverted selection covers the exterior vertices and up and over the sides of the geometry.



6 Add a Noise Modifier to the stack and check on Fractal. Enter 100 for the X and Y Strength spinners. Finally, add a mesh Select Modifier to clear the vertex selection. For rendering more iterations, increase the multiplier spinner in the Plane's Render Multipliers section. This completes our geometry, but the fire's material is a different story. The entire completed scene is included on the cover CD for you to pull apart.

3DS MAX TIPS

You'll need to add colour, smoke, and light effects if your fire is going to smoulder like the real thing

01 The fire material consists of a multi-level material, mixing individual elements of the fire. Right at the base level we have the self-illumination and coloured material, which is generated with multiple Smoke maps. Gradient Ramps are used to colour the smoke the further it is from the centre of our smoke cloud.

02 Several Smoke maps are used to overlay different coloured elements for the fire effect. In essence, each smoke level forms a different colour within the overall smoke 'puff'. The Fire map is overlaid using a Shellac material on top of a dark material to keep the high-intensity multiplied illumination, and also to add some opacity to the overall material.

03 Finally, the Shellac material is mixed with a transparent material using a Falloff map to control the transparency. This enables us to easily amend the overall transparency of the material without having to adjust every material's properties. The entire material tree could be easily condensed into one material, but it's better this way for illustrative purposes.

04 With the overall fire material assigned to the geometry, an Omni light is added to intensify the fire just above (or below depending on the orientation of the geometry) the centre of the fire. Finally, a roof (or floor) plane with a self-illumination gradient is added and positioned to clip the base of the fire geometry to remove the outer corners of the fire that haven't been displaced.

For quick fixes for *3ds max* problems, post your questions in our online forum: **www.3dworldmag.com/3dsmax**

RIGHT **As focus shifts from the bottle in the foreground to the bin in the background, the viewer's eye naturally follows the progression of the action and realises the bottle is about to fall into the bin**

ON THE CD
Supporting files for this Q&A

LightWave

by BENJAMIN SMITH

QUESTION

"How can I get depth of field to render the bits I want in focus as well as the bits I want blurred out of focus? Please help me!"

SHEILA VINCENT | via email

ANSWER

Depth of field is one of those little touches that's often almost imperceptible in a render, but that adds a huge amount of realism to the image. To the untrained eye, if parts of the image are out of focus, this implies that it must have been photographed with a real camera. Depth of field is also a useful device for leading the viewer's eye to the most important parts of the image: place a character against a blurred background and the eye can't help but be drawn to the foreground element. It's also very useful for implying a sense of scale, since macroscopic scenes (teeny tiny ones) naturally have a much shallower depth of field.

LightWave can render things out of focus out of the box, by simply activating the Depth of Field feature on the Camera Properties panel. It renders the blurring by moving the camera ever so slightly between antialiasing passes, so to get any effect at all you must set AA to at least Medium level and turn off Adaptive Sampling. There are two controls for depth of field: Focal Distance and F-Stop. The Focal Distance is the distance from the camera in which the image is focused; everything closer or further away than this distance will be blurred. F-Stop relates to the real-world setting of the camera's iris, but for our purposes you can ignore this and read F-Stop as 'amount of blurring', where smaller numbers means more blur.

MEASURING UP

To set up a depth of field effect in a scene, you need to correctly set the Focal Distance. On a film set it's not uncommon to see an assistant use a tape measure to find the correct focal distance between the camera lens and the subject, and you can do the same thing in *LightWave*. You can do this by adding a null named Focus and parenting it to the camera. By sliding the null along the Z axis, you can find out exactly how far the subject is and then use that distance as the camera's Focal Distance. Alternatively, you can write an expression that uses the Focus null's Z parameter as the camera's focal depth, so by animating the null you can easily animate the setting.

The disadvantage of this technique is that if the camera moves around a lot, it's very hard to keep it focused on a static subject. An alternative technique makes the Focus null totally separate from the camera and uses an Expression to determine the distance between the two. Learn how to apply both of these expression techniques in the tutorial on the right.

Once you've set the Focal Distance, it's pretty straightforward to set the F-Stop. Start with the default value of 4, and perform an antialiased OpenGL render by holding the mouse over the camera viewport and pressing [Shift] + [F9]. This is faster than doing a real render, and gives you more time to fiddle with the setting to get it right. Remember, smaller F-Stops give more blur. Remember also to be subtle: even a slight blur will contrast with picture elements that are in sharp focus, and in an animation the effect will be far more obvious than in a still image.

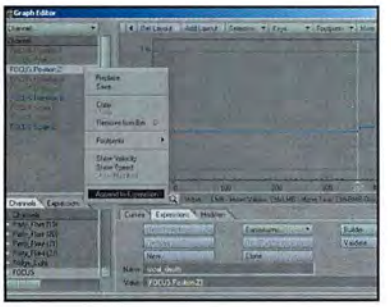
LightWave's depth of field effect is okay, but it's slow to render and doesn't look that great when you apply very small F-Stops for really big blur effects. A better approach is to apply a plugin that performs post-processing blur on the image to simulate depth of field. *LightWave* includes one such plugin called Digital Confusion, but this is so bad that we'd advise against even trying it. Instead, check out X-Dof from www.evasion3d.com, which is a truly awesome depth-of-field renderer that yields beautiful results and is a lot faster than *LightWave's* built-in DOF.

BY: BENJAMIN SMITH WEB: WWW.SFDP.CO.UK
Benjamin Smith is the award-winning animation director of Stormfront Digital Pictures, yet he still finds time to help his fellow *3D World* readers

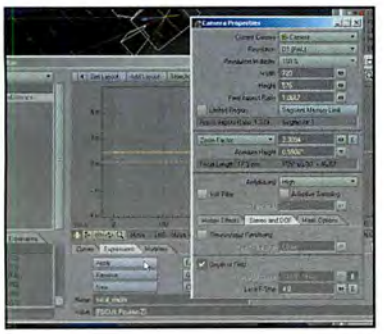
STEP BY STEP: KEEP FOCUSED

You can write expressions to keep the camera focused on a target null throughout the animation

1 Add a null, name it Focus, and then parent it to the camera. Slide the null along the Z axis with its blue handle until it intersects the subject of your scene (the bit you want to be in focus), and keyframe it there. With the null still selected, open the Graph Editor.



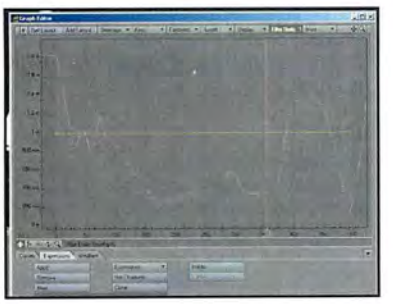
2 On the Expressions tab of the Graph Editor, hit New, rename the expression focal_depth, and remove the word Value from the Value field. Then find the blue FOCUS.Position.Z channel in the curve bin and right click it to choose Append to Expression.



3 Open the Camera Properties panel and hit the E button next to Focal Distance to load this parameter into the Graph Editor. Hit Apply on the Expressions tab to link the Focus null to the Focal Distance so the null controls it.

4 If you prefer the null not to be parented to the camera but just to float in space, un-parent it and hit the Builder button in the Graph Editor to get into the Expression Builder. From the Builder's menu go to Utility Functions > Range Finder (Items).

5 The Builder gives you two fields: Item A and Item B. Under Item A select World Vector, and in the new window choose one of the cameras channels (it doesn't matter which). Likewise, set Item B to be the Focus null, and hit Accept, then Create Expression.



6 Apply this expression to the Focal Distance parameter instead of the first one. Now, no matter where you move the camera, it remains focused on the Focus null, even if the null is moving. It's like magic, except with computers, and no rabbits.

LIGHTWAVE TIPS

Understanding the ins and outs of F-Stop and depth of field will enable you to focus on the job

01 The F-Stop refers to the diameter of the camera's iris, which is the ring-like opening (fnarr fnarr) behind the lens. In an ideal world, the iris is tiny (the size of a pinhole), and the image is always totally in focus. However, in the real world, the iris has to open to allow more light in, and so parts of the image go out of focus depending how far they are from the focal distance and the size of the iris opening.

02 You should note that in bright scenes there's very little depth-of-field blurring, since there's loads of light and the iris can be stopped down quite small. In dark scenes, however, the photographer has no choice but to open the iris wider to allow enough light in to photograph the scene, which creates a lot more blurring.

03 Packages like *After Effects* and *Digital Fusion* allow the blurring of 3D elements to simulate depth of field using a rendered Z-Buffer image. The results can look very good, but depend on the ability of your 3D package to render an antialiased depth buffer as well as Z coverage and background fill passes. Unfortunately, *LightWave* is rubbish at this, but it *can* render an antialiased depth buffer if you find the Depth Buffer AA option in the Edit Menus window, assign a button to it, and then switch it on.

04 You can add an extra visual reminder of the camera's depth of field by adding a new null to the scene, parenting it to the camera, and adding the Depth of Field display plugin from the Geometry tab of the Object Properties panel. With the null selected, a greyed-out box shows the region that can be safely considered in focus.

For quick fixes for *LightWave* problems, post your questions in our online forum: www.3dworldmag.com/lightwave

RIGHT **Create spectacular electrical displays using *Maya's* Dynamic Lightning Effect. You can control the colour, intensity, and duration of each arc as well as change its start and end positions. Check out the movie on the CD**

ON THE CD
Supporting files for this Q&A

Maya

by GEORGE CAIRNS

QUESTION

"How do I create animatable arcs of electricity that can jump spectacularly between two pieces of metal?"

BRIAN DAVIS | via email

ANSWER

On reading this question, a thirties-style mad scientist's lab came to mind. You know the type of thing: giant Tesla coils spewing out bolts of lightning. (Dr Frankenstein's electricity bill must have been a horror.) After hunting around the Web, we found plenty of people still engaged in the dangerous hobby of generating DIY lightning bolts with home-made equipment. The tutorial on the right shows you how to create your own *Maya*-induced electrical arcs without the need for life insurance or rubber wellies.

In movie post-production, masters of the hand-painted *lightning technique* (such as Steve Begg) paint on the electrical arcs frame by frame to control its behaviour. Check out Sean Connery's electrifying exit at the end of *The Avengers* for an example of hand-painted lightning. However, *Maya* has a terrific Lightning Effect feature that gives you the power of Thor to zap bolts of electricity at the targets of your choice. (Now if only that worked in real life!)

To start with, you need to create a Tesla generator or whatever hi-tech gizmo you fancy as a source of electricity. *Maya's* Lightning Effect works happily with either NURBS or Polygonal shapes. Since the bolts jump between the pivot points of each object, you'll need to move them to the part of the object you want the lightning to strike (see Step 2 in the tutorial on the right).

BOLT FROM THE BLUE

Maya's lightning bolts are unleashed from the Effects section of its Dynamics Menu Set. They are made up of soft body curves with extruded surfaces. Like most *Maya* elements, the lightning bolts are fully editable using the Attribute Editor. You can change their colour, thickness, level of jaggedness, and the distance of their spread. Once you've customised the general look of the bolts, you can animate a particular bolt's start and end time (see Steps 5 and 6).

Helpful manipulators enable you to move and keyframe your arcs of electricity to crackle up and down the objects they are striking (see Step 6). *Maya's* Lightning Effect interacts with the objects in the scene by illuminating them just like real lightning would do. When you create a bolt of lightning, a light is automatically added to the centre of the bolt. To edit the effect of the lightning on its surroundings, you need to adjust the Light Intensity attribute. Then, with hardware shading turned on, Press [7] to turn on Use All Lights. When you play the sequence, you can see the effect of the lightning on the environment as it illuminates and colours its surroundings. And when you render the sequence, the lightning and its optical glow effect is applied to every frame. You don't need to composite it separately in another package.

BRIGHT SPARK

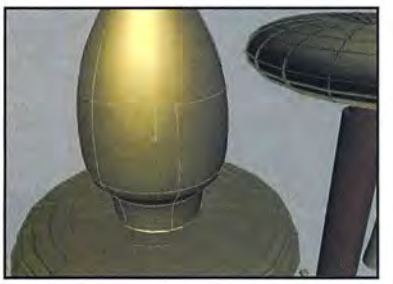
A way of augmenting the Lightning Effect feature is to paint extra sparks of electricity onto your objects using the Visor Electrical brush. If you plan to do this then you'll need to stick to building NURBS objects, as you can't paint on Polygons. In the Dynamics Menu Set, select the NURBS surface. Go to Paint Effects > Make Paintable. Go to Window > General Editors > Visor, and choose one of the brushes from the Paint Effects Electrical Folder. Now you can paint some extra sparks to add to the existing lightning bolts. This will greatly add to the drama of your sequence.

GEORGE CAIRNS WEB: WWW.GEORGECAIRNS.COM
George Cairns has been helping *3D World* readers with *Maya* problems since its launch, and helping daytime students for much longer...

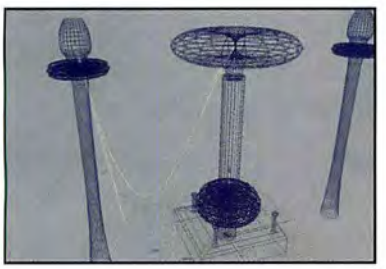
STEP BY STEP: IT'S ELECTRIFYING!

Creating and animating dramatic lightning and electricity effects is a doddle thanks to *Maya's* Lightning Effects tool

1 While this Q&A is predominantly concerned with creating and animating lightning, it's necessary to look at how aspects of the modelling help to make the animation work successfully. Create a Tesla coil or similar electrical device using NURBS or polygons. We used polygons because we like the option to extrude their edges, which is how we made the ridges on the central coil.



2 Add a couple of poles for the lightning to jump to. Select the Move tool ([Q]). You'll notice that the pivot point is at the base of the pole. As this is where the bolt will strike, we need to move it to the top. Press [Insert] (or [Home] on a Mac). Now you can move the pivot point up in the Y axis so that it rests at the top of the pole.



3 Select the Tesla coil then Shift-select one of the two poles. Go to the Dynamics Menu Set. Choose Effects > Create Lightning. Notice that a curve is drawn between the two selected objects. It travels from the first selected object and hits the second. If the lightning looks a little on the saggy side, follow the next step to position it more accurately.

4 We want the lightning to spark between the coil and the top of the pole. The lightning curve has a From direction handle and a To direction handle. Grab the handles and move them up in the Y axis until the lightning joins the two objects at the preferred points. Hit Play and you'll see that the bolt stays on for the whole sequence as it crackles between the two shapes.

5 Click the red selection handle at the midpoint of the lightning bolt. Open the Attribute Editor. In the timeline go to frame 1. Set the Lightning Start and End points to 0, right click the Lightning End channel, and set a key frame. Move forward in time a few frames, set the Lightning End to 1, set another keyframe, then play the animation and watch the bolt fly from the Tesla coil to the pole.

6 Once the bolt has flickered for a bit (at around frame 41) set another Lightning End key at 1. A few frames later, key in a value of 0 to make the bolt disappear. Play the sequence and watch the bolt hit the pole, crackle for a bit, then disappear. To make the lightning move around the surface of the objects, keyframe the manipulators controlling the start and end points of the lightning.

MAYA TIPS

Lightning can and does strike twice – make it easier to effect with our high voltage tips for *Maya*

01 When adding lots of objects to your scene, you'll need to zoom in and out to work on them individually. To get an instant close-up on a specific object, select it and press [F]. The selected object will fill the window. If you want the window to display the whole scene, deselect everything by clicking an empty part of the work area and press [F] again. Now the whole scene will fit into the window.

02 Multiple objects can clutter the work area, and *Maya* offers lots of ways round this problem. Select the object you want to work on. To hide the rest of the objects in the scene, go to Display > Hide > Hide Unselected. Now you can edit the object without being distracted by the general clutter. To restore everything, go to Display > Show > Show Last Hidden.

03 You might set a Lightning End point of 1, and then wonder why the attribute value increases to 1.3 during playback. When you're keyframing the Start and End points of the lightning bolt, make sure your tangents are set to linear and not to spline, otherwise the lightning will overshoot its mark. Select the keyframes in the timeline and right click. Go to tangents and set them to linear. (You could do this using the Graph Editor, too.)

04 Once you've mastered controlling the look and behaviour of *Maya's* Lightning Effect, you can adapt the technique for a variety of projects, from creating an all-out lightning strike to tiny crackling sparks of static electricity. Go get creative.

For quick fixes for *Maya* problems, post your questions in our online forum: **www.3dworldmag.com/maya**

RIGHT **With a little creative use of volumetric light and camera placement, light wrap effects can be faithfully recreated. Model by Roger Castro, student at University of the Incarnate Word (www.cgauiw.com)**

ON THE CD
Supporting files for this Q&A

Cinema 4D

by ADAM WATKINS

QUESTION

"I love the new *Halo 2* trailer in which the character emerges from a wall of light with the light wrapped around him. How can I do this in *C4D*?"

TOM WHITE | via email

ANSWER

Through a dynamic and interesting announcement trailer, Bungie has announced that *Halo 2* is in development. If you're excited about the game, the trailer (which can be downloaded from www.bungie.net) will also give you plenty to get worked up about.

Perhaps the most interesting part of the trailer is where the hero steps into a dark hallway from a brightly lit room. The visual result is a black silhouette of the form, but the silhouette is not just a black shape cutout...

In several places (for example, the shin and the hand) the silhouette has a soft gradation, as the extreme light gently rolls around the curved surfaces of the character's body. This is an interesting look and one that might go against our initial thinking of how light works. It's easy to assume that since we are on the opposite side of the light source, there would be a clearly delineated line indicating the object blocking the path of the light. The wrapping effect of the light in the trailer is very close to what happens in the real world and is referred to as 'light wrap'.

Light wrap is a beautiful effect in which light wraps itself around an object on the opposite side of the light source. The result is gentle gradations of light to dark depending on the surface around which the light is wrapping. In addition, light wrap is controlled (in the real world) by the distance that the light source is from the object, the angle of the source, and, of course, the light's intensity. Also important to note is that in the real world, when the light source increases, the wrap increases as well.

FAKING IT

Alas, the problem with most raytracers (including *C4D*'s) is that they don't calculate light wrap. When an object stops a ray of light, the ray is blocked. The light does not know that it should curl around the surface that it has come up against. But this, like so many other realities of physics that are not synthesised with raytracing engines, can be faked with a little creative thinking.

The first step in faking light wrap is to use volumetric light. Although in real life, light wrap occurs even if we can't see the light's rays; in 3D, volumetric light is vital. In the *Halo 2* trailer, the room from which the hero emerges is completely white, as in a very high intensity volumetric light. Be sure you have absolute control over the Inner and Outer Distance of that volumetric light's falloff. Too much volumetric light travelling too far will completely obliterate the curves you're trying to wrap around, but too little light won't give you any wrap effect at all.

The second important step is to control where the camera sits in relation to the scene. Real-world light gently wraps around a surface, in a curvilinear fashion. This faking-it method will simply allow the linear nature of raytracing light to overlap the surfaces. This is not as far away from the real-world effect as you might initially think. Real light wrap is most pronounced when you're viewing an object from the side directly opposite the light source. Our fake effect is no different as long as you make sure that your camera is directly opposite the light source.

The third step is to use a bit of depth of field in your scene. By making sure that there's some blur in front of the actual focus point, *C4D* will blur those edges to provide an even softer gradient.

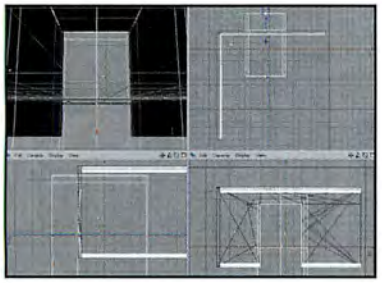
The specifics of this method will change depending on your scene. The important details to remember are volumetric light, a camera sitting directly opposite that volumetric light source, and a bit of depth-of-field blur. With this set up, any object can have a wrapped effect.

BY: ADAM WATKINS WEB: WWW.UIW.EDU

Adam Watkins lives in Texas, where he is the Director of Computer Graphics Arts at the University of the Incarnate Word

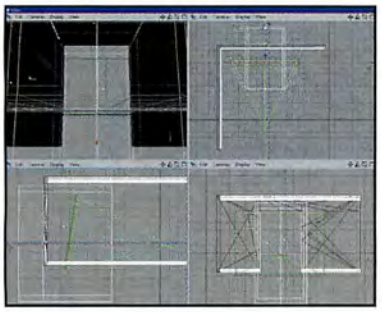
STEP BY STEP: IT'S A WRAP!

Creating a light wrap effect in most raytracing packages is a lot easier than you might expect. Here we use C4D

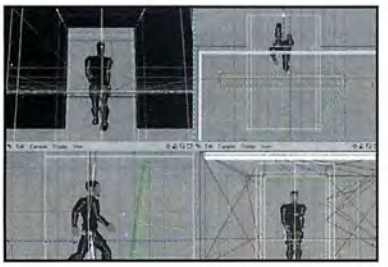


1 Create a light source that is a Parallel (Square) and place it directly behind your subject. Spot (Square) will also work for this effect and can give more dramatic light wrap effects, but, generally, Parallels are the best for the subtle touch. Make sure the light is shooting straight on to where the camera will be.

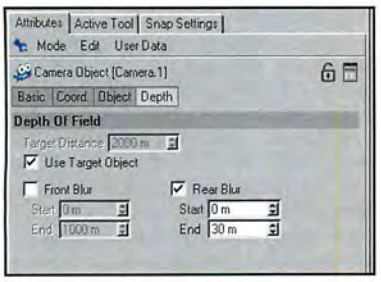
2 Make sure you set your Visible Light to Volumetric. Typically, you'll want to have very high intensity settings in the Visibility tab to give good volume to the effect. Also, make sure you turn on your Falloff settings and adjust them so that the Inner Falloff intersects where your subject will be, while the Outer Falloff doesn't quite reach your camera.



3 Create a camera and position it so that it's exactly opposite your light source. There's a little bit of play that you can work with in the vertical angle, but try to keep the camera pretty much even with the light source on the other side of the subject.



4 Positioning of the subject around which the light will wrap is very important, and it will probably take several small test renderings before you get it right. The important thing is to position the light's Volumetric Inner Distance at about the middle of the subject; this will help to provide short, intense rays of light that peak through cracks on the subject's surface.



5 Make sure you give your camera at least a Rear depth of field. This means that beyond a certain point, as a post-rendering effect, *C4D* will blur the image and soften all the edges. As in the screenshot shown above, set the falloff, where the image will be out of focus, to be well before the actual subject – we want him blurred.

6 If you're using R8, make sure you play with the Depth of Field Blur Strength within your Render Settings. In general, you'll find that for this effect, a very slight blur (2%) will usually do the trick. However, using a bit of White Tint will also help to soften the edges and make the outlined shapes softer.

CINEMA 4D TIPS

To finish things off, here are some essential tips for getting the lighting of your subject just right

01 In the sample final rendering, you'll notice that we can still see the character's face (modelled and designed by Roger Castro). If the only light source in the room was the strong white light behind our character, the face would be completely black. However, the design of this character is so strong that we wanted to be sure we'd see those vehement eyes. You need to add some very soft, low intensity lights to the front of your subject to illuminate the bits you want to see. Of course, if the unseen face and silhouette is most important, leave these fill lights out.

02 Volumetric light can be used for many interesting effects, but it can also be tremendously time-consuming to render. Furthermore, with the wrong settings, volumetric light can produce strange and undesirable artifacts in your scene.

03 Take careful notice in the Visibility tab of your light source of the Sample Distance setting. The default is usually set at around 25m, and, typically, this is just right. However, sometimes your scene contains more detailed cracks that light is supposed to seep through. With a setting of 25, you can often get nasty chunky things or snake-like artifacts floating through your volumetric beams.

04 Decreasing the Sample Distance setting can help to clean up the volumetric light, but this also adds considerable rendering time. Unfortunately, the only way to find out if your setting is too high is to render. Many small test renderings need to be done before firing up the high resolution render. Make the Sample Distance as large as you can while maintaining the visual integrity of the light rays.

For quick fixes for *Cinema 4D* problems, post your questions in our online forum: **www.3dworldmag.com/c4d**

RIGHT **If you want to create a skin texture that has warts-and-all realism, you'll first need to take photographs with the minimal amount of lighting effects**

ON THE CD
Supporting files for this Q&A

Poser

by MAT BROOMFIELD

QUESTION

"How do I create a texture for Michael 2 in *Poser* and add a button to my library that applies it to my figure automatically?"

GEMMA WORTHING | via email

ANSWER

Creating a texture (and custom morphs) for your *Poser* figure is a great way to personalise your scenes. If your maps are any good, they're also a fairly good way of making money.

In *Poser 5*, you can create procedural textures, but they aren't ideal for adding to figures because they lack the details (warts, moles, pores) that make a real person's skin unique. Therefore, I'll be concentrating on how to create a bitmapped texture using real photographs. This technique also applies to *Poser 4, Poser Pro Pack*, and *Poser 5*.

The essence of creating a human skin texture is similar whether you're creating it for use in *3D Studio, Poser*, or any other program that supports textures. However, there are some special considerations for DAZ's characters (Michael, Victoria, and Stephanie), because they have quirks not found in standard *Poser* characters. However, as the most popular figure models for *Poser,* they have become the *de facto* characters used by most *Poser* modellers.

As you would expect, these characters use UV mapping, which essentially wraps a texture around the model, so that every part of the model receives a unique area of the bitmap. This enables you to create detailed maps that show all the eccentricities of human flesh. One of the advantages of UV mapping is that it allows for bitmaps of any size, so if your figure will be primarily seen at a distance too great to detect individual skin details, it makes no sense to create a resource-gobbling 4,000 x 4,000 pixel body texture, when a 1,500 x 1,500 texture will look just as convincing, and will render quicker and leave more memory for other scene elements.

STRIKE A POSE

Before you can start creating your textures, you'll need decent photographs of your model, and before you can do that, you'll need to know which parts of the model will require particular attention when taking the photographs. The photography is one of the most crucial stages because poor photography leaves you with far too much post-work to do. What you should be trying to achieve is photographs with the minimal amount of shadowing or lighting effects. There's no point creating textures that are pre-lit, when the models they are attached to will be interacting with *Poser's* lights in many different ways.

The DAZ figures have separate texture maps for the head and body. This enables you to create maps of different resolutions for each part, perhaps concentrating on creating a high-resolution head map for close-ups.

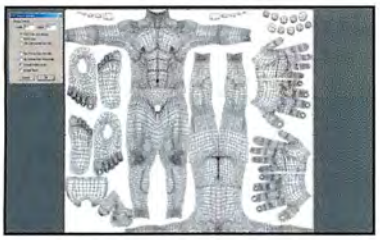
When you've created your texture, you'll want an easy way to apply it to your models. Of course, you can always load the texture manually each time you want to use it, but a far better way is to create a MAT Pose file. A MAT Pose is a special type of Pose file that was invented by members of the 3D community some time ago. It consists of two or three files, the first of which is the PNG file that contains the thumbnail image. With *Pro Pack* and *Poser 5*, this file is optional as the image is included in the RSR file. The RSR is the resource file. The third file is the .PZ2 file, which contains information about the location and setting of all parts in a pose. However, it was discovered that this file also accepted values about the textures applied to a figure or element. You can edit these files using a text editor, but we'll be using a free program called *MAT Pose Edit*.

So, from model to texture, the process is much easier than you might think. All it needs is time and patience.

BY: MAT BROOMFIELD EMAIL: MATB@CIX.CO.UK
Mat Broomfield has been a journalist for 15 years and has been an avid user of *Poser* since version 1

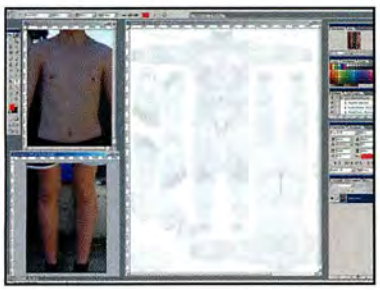
STEP BY STEP: PERFECT SKIN

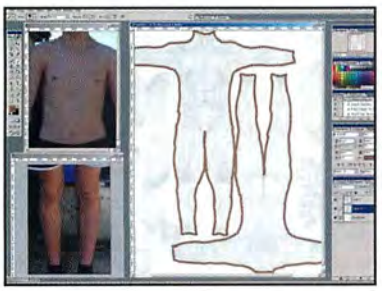
You can spend weeks creating pixel-perfect *Poser* textures, but here's a way to get good results in a fraction of the time



1 Create a texture template. The easiest way is with *UV Mapper Pro*. Navigate *Poser's* directories to your Michael geometry file and load it. Go to the Select menu and choose Select by Material, then select all head parts. Press [\] to hide the selection, save the Template at the required resolution, and ensure that Exclude Hidden Facets is checked. Repeat the process, selecting all body parts. You now have the required templates.

2 Take your photographs. You can see the way the templates are divided and which parts to focus on. Shoot outside on a cloudy day with a long lens to flatten the image and reduce shadow. If you have a low resolution digital camera, you may wish to photograph each body part in many sections in close up. Regardless of your camera, take lots of head pictures from multiple angles. Try not to include the hair.





3 Open *Photoshop* and create a blank background the same size as your template. Load your template and reduce its opacity to 20% – that should be just enough to see the shape of the contour lines. At all times you'll need to ensure that the template layer is on top of any other layers you add. Load your photos.

4 Create a new layer below the template layer. Determine the average skin colour in your photo and using a 10- or 20-pixel hard brush in that colour, draw a line around the edge of the template on the new layer so that it protrudes outside the template borders by a few pixels. This hand-drawn seam will ensure your edges match up.

5 Cut the body photos out of their background and paste them into another layer below the outline layer you just drew. You can now stretch and manipulate the photo parts to create an approximate fit using the template layer as a reference for the details. Use the clone brush, airbrush and blend tools to blend the edge layer into the skin layer and any body parts together. Save the texture as a JPG in your *Poser* textures directory.

6 Using *MAT Pose Edit*, load the Michael figure with the Load Character File option. Don't waste time loading the character's morphs. In the Materials screen, select a body part, then go to the Texture Map section and load the texture you just created. Work through all the head and body parts doing likewise. When you're done, save the file as a Pose file to the *Poser* Poses directory. The MAT file is complete and ready to apply.

POSER TIPS

Don't waste time struggling to work everything out yourself – here are our essential tips

01 **Every serious *Poser* user needs the ability to create and edit his own textures, and to do that, you'll first need a way to generate and realign your own UV map templates. By far the cheapest and most direct solution is *UV Mapper*, which is available as a shareware program. However, you can also buy the full Pro version of the program for a trifling $50 (about £30). To find out more, go to www.uvmapper.com.**

02 **Texturing *Poser* figures is a particular skill that has unique eccentricities not encountered by other model textures. To find out all the considerations, check out BTSculptor's superb pair of tutorials, which are available from Renderosity priced at just $16.67 (about £10) each. You can get them from http://market.renderosity.com/softgood.ez?ViewSoftgood=13731.**

03 **It takes ages to create MAT and MOR Pose files by hand, manually editing text files. Why waste your valuable time when there's a great free program that does it for you? You can get *MAT Pose Edit 2.02* from Renderosity's Free Stuff area. The program also helps you to create Pose and MOR (morph) files. Go to www.renderosity.com/freestuff.ez.**

04 **High-resolution textures need high-resolution templates. Don't struggle with resized templates when it takes less time to simply create a fresh template at the required resolution with *UV Mapper*.**

05 **You don't have to store your MAT files in an existing Pose folder. You can create a new sub-directory within the Pose directory, but don't nest sub-directories.**

For quick fixes for 3D problems, post your questions in our online forum: **http://forum.3dworldmag.com**

IN THIS ISSUE

SoftimageIXSI 3.0

Astonishing new features drive the Softimage flagship ahead of the pack

BY SIMON DANAHER

See below for prices

SUPPLIER SOFTIMAGE CONTACT +44 (0) 1753 655 999 WEB WWW.SOFTIMAGE.COM FORMAT PC

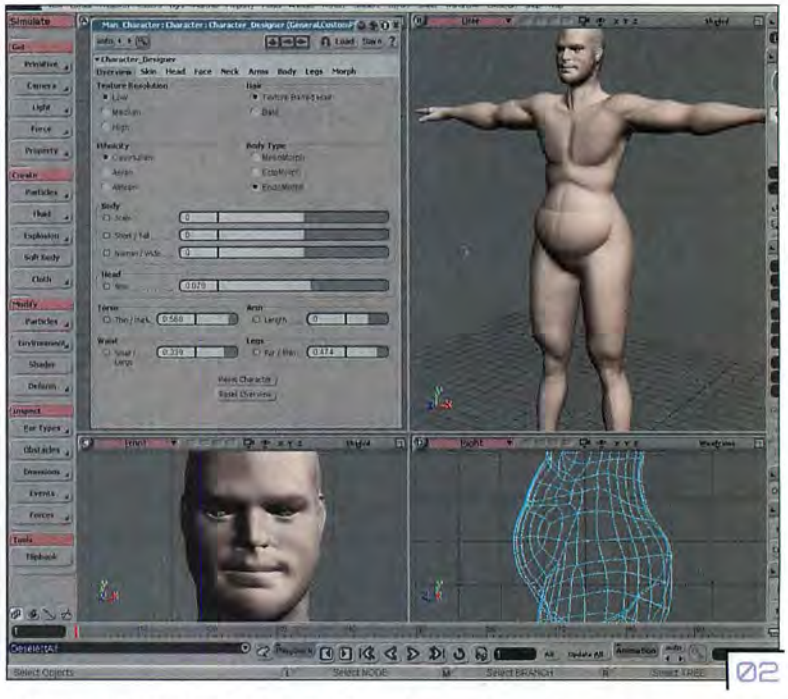
PRICE STRUCTURE
- Essentials $6,750 (Workstation)
- Essentials $7,995 (Enterprise)
- Advanced $11,750 (Workstation)
- Advanced $13,995 (Enterprise)

MINIMUM SYSTEM
- Windows NT4(SP4)/ 2000(SP2)
- *Internet Explorer 5.0* or higher
- AMD K7/PII or better processor
- OpenGL graphics card
- 1,280 x 1,024 display
- 256MB RAM

MAIN FEATURES
- Super-fast Sub-ds
- Improved hair and fur
- Crowd simulation tools
- New particle system
- *mental ray 3.1*
- HDR image support
- Micro-triangle displacements
- Image-based lighting
- Rotosplines
- Grain tools
- New preset character rigs
- New object viewer
- XSI Explorer

Sometimes it's a difficult task to assess a high-end 3D program. But while the uses to which these systems are put can vary widely, productivity and workflow always come top of the list of requisite abilities. *XSI* has always been a very impressive package in this respect, although a lack of features can easily wash away all of the workflow gains. This is a situation that *XSI* was in when initially released. Not so with version 3.0.

At long last *XSI* is really starting to shine, and the effort that Softimage put into its early development is clearly paying off. While there are a lot of new features and subtle-but-effective improvements, it's easy to lose sight of the big picture: *XSI* is a wonderfully integrated 3D environment. The core of the package revolves around the integration of the excellent *mental ray* renderer and a non-linear animation system. But it's the attention to detail in every respect that really impresses, and this is where *XSI* makes other programs feel very dated.



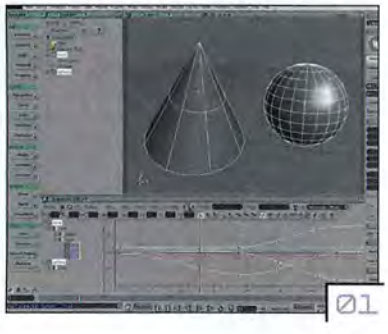
02

LOOK AND FEEL

Even if you feel that the interface of a 3D program is unimportant (it isn't), there's no denying the beauty of Softimage's design. But the surface appearance is a reflection of the elegance of the program's workflow. *XSI* feels as good as it looks, and it has a habit of providing solutions to even the most difficult production nightmares.

YOU CAN BUILD COMPLEX CROWD SCENES INCLUDING FLOCKING, AVOIDANCE, AND BEHAVIOURS

Version 3.0 improves on the already excellent polygon modelling in version 2.0, and – in particular – Subdivision Surfaces performance has been improved significantly. These are blazingly fast even when densely subdivided; when modelling and animating they are easily the fastest around. All polygon objects have a built in Geometry Approximation property to enable Subdivision smoothing, but in 3.0 there are now two sliders, one for display and the other for rendering. Despite the fact that *XSI*'s Sub-Ds do not use the true hierarchical method as in *Maya*, they do support n-sided polys and variable edge/point weighting, making then almost as flexible. Add the massive speed increase and you'll wonder how you ever managed before.



01

Multi-resolution references is a new feature that offers four levels of detail. Modelling performed on the low-resolution model is automatically passed to the high-resolution versions as they are loaded. This will help reduce memory consumption on very complex scenes. Further performance advantages can be gleaned from the new partial geometry display option, allowing polygon and Sub-D objects to display only the selected components when required.

03

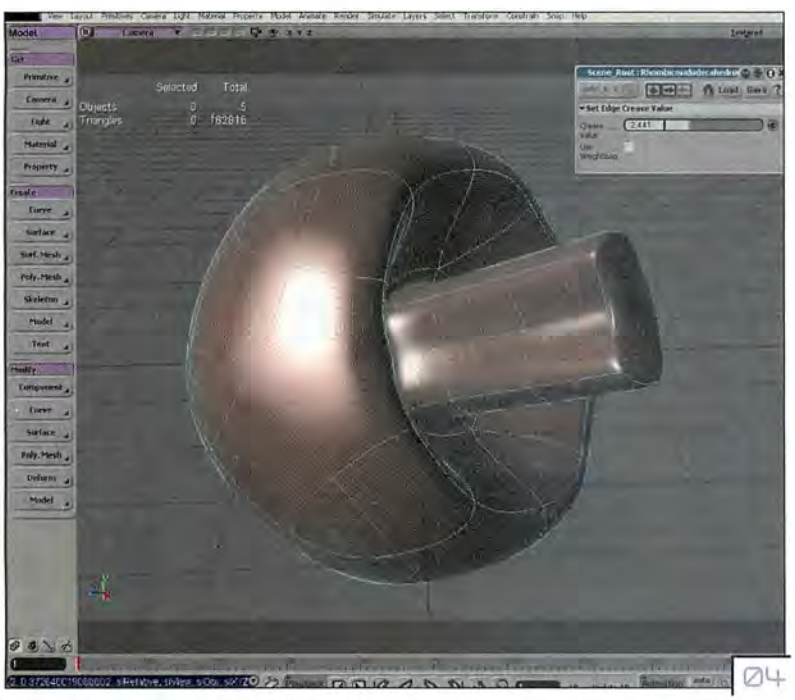
Feedback of animation data has been improved with the addition of keyframe markers, which display as small coloured triangles at the objects' axes. For example, during translation animation, the triangle will display as red if there's a key recorded at that frame, green if no key is present, and amber if a key is modified. Likewise, there are different triangles for f-curves and expressions.

The display of joints has been improved, too. You can now choose from a number of display types from standard 'double pyramid' to cylinder, box, and cone, to name but a few. Nulls can also be viewed as cubes, spheres,

[01] **Animation cues display as triangular markers that help you to visualise key frames for a given object**

[02] **The new Character Builder can be used to quickly generate custom film-grade models**

[03] **The XSI Explorer is a new view that incorporates an Explorer panel with either a sub-Explorer view or Object, Schematic, or Render Tree**



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and arrowed spheres. Further improvements come in the form of IK/FK blending that now works with effector animation. Other character improvements include the Motion Deform tool that lets you animate a character along a path (three actually, one for each foot and another for the pelvis) and have it compensate for foot placement and sliding. Project the curves onto a surface and the character will walk over it.

Crowd simulation is another great new feature in *XSI 3.0*. The new system allows animators to build complex crowd scenes including flocking, avoidance, and behaviours. Hair has been improved with new support for overlapping hair volumes and the choice to render hair as geometry if necessary. Workflow will also be improved by the ability to paste hair style data between objects.

GOING MENTAL

As I've mentioned, *XSI* achieves total integration with mental images' *mental ray* rendering software. Several features of this system, such as the high-quality motion blurring, are not available in other versions of *mental ray* since they have been programmed by Softimage itself. New in 3.0 is the micro-polygon displacement mapping. This new displacement technique uses RGB files rather than greyscale to enable displacements to move in all three dimensions, not just up and in.

Of course, simply churning out bitmaps is not the end of the story: the frames will need to be assembled into a finished animation, sometimes involving blending 3D imagery with live footage. There are plenty of third-party programs out there that can do this, but since version 2.0, *XSI* has had its own compositor built in, and in this respect it's unique. Improvements in version 3.0 include the addition of animatable rotosplines and grain addition and removal. Rotosplines allow artists to create masks of complex live-action objects to allow seamless composites of 3D elements into footage. The grain addition tool enables you to match renders to a given film stock, and comes with a few presets to give you a good starting point.

06

WITH THIS RELEASE, XSI HAS BECOME THE BEST ALL-ROUND SYSTEM BY QUITE A MARGIN

OUR VERDICT

All in all, *XSI 3.0* has matured into a fine all-purpose 3D system, and one which leads the field in certain areas. Couple this with a fantastic workflow and built-in compositing and you have a system that's difficult to better. *Mental ray* may be looking a bit long in the tooth when compared to upstarts like SplutterFish's *Brazil*, but it's a proven production tool with *PRMan*-level rendering quality. The dynamics don't quite match *Maya's* system, and *Houdini's* particles are second to none, but *XSI* has become the best all-rounder by quite a margin. ■

3D VERDICT	9
RANGE OF FEATURES	9
VALUE FOR MONEY	9

PROS **Great workflow >> Fastest subdivision surfaces >> Crowd simulation**

CONS ***mental ray's* GUI may be a little outdated >> Soft bodies and cloth bettered elsewhere >> Very little else lacking!**

[04] **Subdivision surfaces in *XSI 3.0* are blazingly fast. This simple object features a subdivision level of 5 and contains over 120,000 polygons yet can be modelled in near-real time**

[05] **The new Object view isolates the selected object in its own view panel regardless of the scene complexity**

[06] **New character rigs include a Quadruped proportional guide**

Electric Image Universe 5.0

It's come along in leaps and bounds, but does it go the extra mile?

BY ALEX LINDSAY

$1,295 (£820)

UPGRADE (FROM UNIVERSE 4.0) $395 SUPPLIER ELECTRIC IMAGE CONTACT +1 949 481 6660 WEB WWW.ELECTRICIMAGE.COM FORMAT PC & MAC

MINIMUM SYSTEM

- Windows 2000/XP or Mac OS 9/OS X, 384MB RAM, 32MB graphics card, *QuickTime*

MAIN FEATURES

- Radiosity
- Multi-processor rendering
- Variable aspect ratio for camera maps
- Pan/tilt match moving
- *Shockwave 3D* export
- New material management tools
- F-curve improvements
- Timeframe markers

While many applications claim to be 3D's biggest secret, Electric Image probably has the best claim to the title. Used in over 40 feature films including *Star Wars Episodes 1 and 2* (and not just for a few shots, either), most 3D artists know little about the application.

Much of this is down to politics, rather than the product. Many large firms were contracted not to talk about desktop solutions for years, leaving applications like *Universe* in the shadows while it did significant work on some of the largest films in history. Another factor was the application's driving force: while many packages were driven by games or character work, *Universe*'s development was pushed primarily by ILM's 'Rebel Unit' and Digital Matte Department for close to a decade – in a relationship so close, Electric Image began to look like an external software division of the effects company. In consequence, *Universe* became extremely proficient in the areas needed by the two departments – massive set extensions, and hard surface rendering for spaceships – while receiving little development in other, less specialist, areas.

The relative complexity of the product didn't help, either. While Electric Image pioneered Image Projection Mapping in the early nineties, few outside of ILM and a few small effects houses understood how to use it. And while the company built powerful tools for multipass rendering years before everyone else, most animators still don't know how or why to use them. At the same time, Universe fell behind in areas such as character animation.

> ELECTRIC IMAGE HAS REALLY FOCUSED ON MANY OF UNIVERSE'S SHORTCOMINGS IN 5.0

01

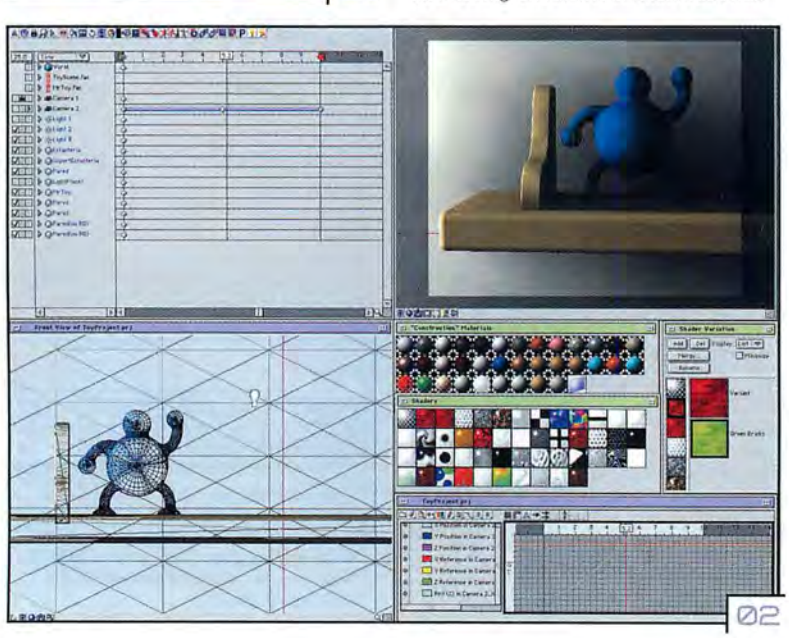
RECENT DEVELOPMENTS

Since the turn of the century, Electric Image has really focused on many of its shortcomings while continuing to improve its core competency – being one of the fastest and best-looking renderers in the business. While the company hasn't become the leader in IK tools, its IK system has made great strides since version 4.0 and is very usable. With many of these main shortcomings in hand, Electric Image has begun to catch up again.

One of the key improvements to *Universe 5.0* is Radiosity. Before version 5.0, only Dome Lighting (a bit of a Global Illumination cheat) was available. But while it's an impressive start, the Radiosity solution in *Universe 5.0* is definitely a 1.0 version. Creating the solution is actually achieved by exporting the scene to an external application, which then meshes the geometry and returns the models with luminence information applied to the ambient surface values (which means you can easily adjust the strength of the effect later). It's still not a point-and-click Global Illumination solution, but then, what is? All in all, while Radiosity is fun to play with, the dome lighting is still the more practical solution.

Match moving has long been separated from 3D applications. This has left animators to jump hoops to correctly import the data. *Universe 5.0* boasts a new Match Move system, which, like *After Effects*, is a 2D tracker, not a 3D one, only handling pan and tilt information, not actual camera positional data. But even with its limitations, it's useful to have the ability to track simple camera moves right in the 3D application. You can leave the real nuts-and-bolts stuff to dedicated packages like *Boujou* and REALVIZ's *MatchMover*. And in fact, that's exactly what *Universe* does. Version 5.0 supports these two industry-leading trackers, making the process much easier than in the past.

While boasting the fastest renderer in the industry, past versions of the Electric Image Camera made little use of the second



02

03

[01] **A standard view of *Universe 5.0*, showing several camera views, project, shader, and materials windows**

[02] ***Universe 5.0*'s frontend is almost entirely menu-driven**

[03] **The new *Radiosity* capability is fun for a while, but it needs to be further developed before it's truly essential**

processor on new workstations. The new version has made up for that in spades with the efficiency of two processors running near to 190% speed increases (many other renderers, with the exception of *Cinema 4D*, achieve increases nearer to 160%). The distributed rendering is also more solid and scalable.

Surprisingly for outsiders, one of the most important new features in Version 5.0 for long-time *Universe* users is the camera mapping. When applying Camera Maps (the core of Digital Matte creation) in the past, all the images had to have the same aspect ratio. This was maddening if you had five or ten different maps for a variety of objects. The upgrade is long overdue and very welcome.

Universe also now exports in *Shockwave's* W3D format. While no one really knows where all the Web 3D stuff is going, the *Shockwave* format is a good bet. Of course, there are a host of other new features from materials and shaders to f-curve and general interface improvements, but those are the most important. But enough praise. Now for a few features and improvements Electric Image needs to think about for upcoming versions of *Universe* – and, hopefully, in the near future.

DRAWBACKS AND OVERSIGHTS

Last year's SIGGRAPH delivered one very clear message: HDRI (high dynamic range imaging) is coming to 2D and 3D graphics, and it is a *big* deal. While the omission of HDRI in *Universe 5.0* is only a minor blemish, its absence in the next revision would be a serious oversight. *LightWave* is the farthest down this road with many already following, while nearly every major effects facility has dedicated resources to HDRI rendering.

And what do *3ds max*, *LightWave*, *Maya*, and *QuickTime* all have in common? Answer: they each have Kaydara's FBX file transfer libraries either in place or just around the corner. This format is becoming key to transferring files between applications, and while Electric Image has announced support for the format, it hasn't implemented it in this version of *Universe*. Without it, the application may get left out of important pipelines.

04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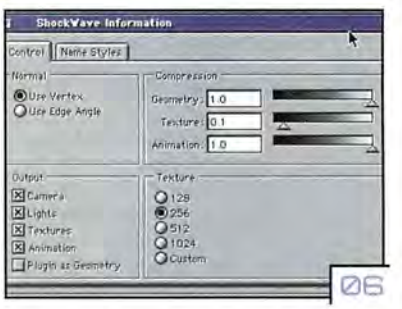
And another niggle: before version 3.0, *Universe* had one of the most powerful file translators in the world, but now it's been reduced to the most basic of any production application. While usable, this needs to be improved and refined in future.

Similarly, while the Electric Image Modeler is completely spline-based, the Animator is polygon-based. What's wrong with this picture? The company will need to bite the bullet and pull these two pieces together – as well as adding true UV mapping – within the next two revisions. And *Universe*, with its strong hard-surface pedigree, should definitely consider a dynamics engine.

Finally, a pie in the sky suggestion for the developers: spin off the Radiosity – it's already running in a separate application. If Electric Image found a way to export the files to a generic file format, this alone would be a fantastic $149 application.

OVERALL VERDICT

All in all, *Universe 5.0* is pretty much like its predecessor. It's not very sexy, and in places it's pretty cludgy – but it is a powerful production application. There are very few applications out there that can handle the sheer volume of polygons, lights, and textures that *Universe* chews through. With the addition of new production features and much needed improvements, the application could handle almost any possible 3D project. Given another significant revision in less than a year, things could soon start looking extremely bright again in the Electric Image camp.



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3D VERDICT	8
RANGE OF FEATURES	8
VALUE FOR MONEY	9

PROS **Screamingly fast renderer >> Easy to get work done quickly >> Useful basic match moving feature >> Separate Radiosity utility**

CONS **No support for splines in animator or renderer >> Needs better file transfer protocols >> No full UV texture mapping support**

[04] **The multi-processor renderer is probably *Universe 5.0*'s most impressive feature**

[05] **The Match Move system is a useful extra, but you'll still need *Boujou* for complicated operations**

[06] ***Universe 5.0* now exports in *Shockwave*'s popular W3D format**

Swift 3D V3

Low-cost 3D animation for *Flash* – or is it the other way round?

BY SIMON CORNISH

£108 ($169)

SUPPLIER ELECTRIC RAIN CONTACT +1 303 543 8230 WEB WWW.SWIFT3D.COM FORMAT MAC/PC

MINIMUM SYSTEM
- Windows 95, 200MHz CPU, 32MB RAM
- Power Mac, 64MB RAM (OS X not yet supported)

MAIN FEATURES
- New SWFT layered import for *Flash*
- Upgraded RAViX III vector engine
- New EMO raster engine
- Raytraced shadows
- Easy-to-use 3D modelling and animation
- Extensive preset library

With its revised render engine and greatly expanded feature set, version 3 of *Swift 3D* is bound to be a desirable tool for both *Flash* users and 3D professionals alike. The revision has been pretty comprehensive, with the improved RAViX III engine as well as the new rasterized rendering capability. Shadows are now raytraced, and the new package bristles with new 3D modelling tools and presets.

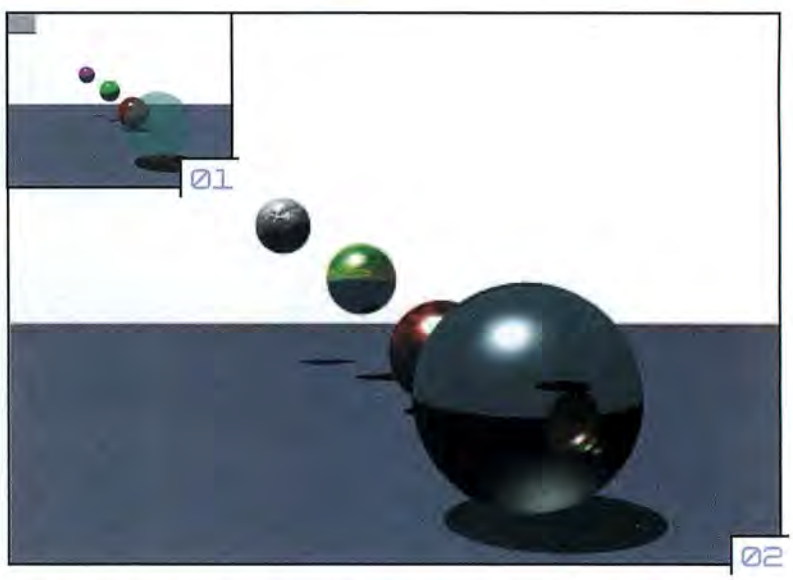
Installing *Swift 3D* automatically includes the .SWFT importer plugin for *Flash MX*, enabling you to edit the document layers within *Flash*. For a novice user, this is a great introduction to 3D and even experienced artists will find it quite useful for getting cool effects into *Flash*.

Once installed, the interface is reminiscent of a cross between *Flash* itself and early versions of *Infini-D*, and incorporates dockable toolbars and scaleable window palettes. The main toolbar presents a set of one-click primitives as well as cameras and lights. Tabs above allow you to jump into the Extrusion editor, Lathe editor and Render settings. The main Properties panel is down the left, while the timeline is at the top.

The two main OpenGL view windows allow you to choose different viewpoints. Much of the work involves clicking and dragging within the window or dragging and dropping to add properties to objects. The viewport also allows you to run a quick scanline render. At the bottom are the rotation balls for objects and lights and a selection of tabbed gallery palettes giving access to a really comprehensive selection of materials, environments and pre-defined animation sequences.

Modelling is very easy but could be more sophisticated. Some of the tools are a little clunky to use, particularly the rotation ball, which really could do with a numerical input panel of its own. 3D text creation is smooth and simple, as is using the Lathe or Extrusion tools, which also animate point deformation morphs.

04

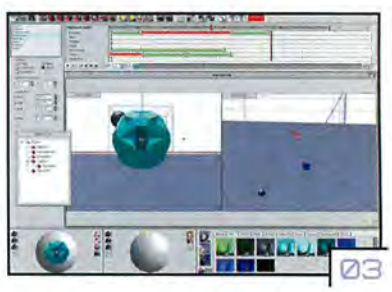

01 02

In addition, many of the object properties can be animated, including materials. Key frames can be copied and pasted but groups of key frames can't, which can make setting up cycles a bit awkward. However, objects can be copied and pasted between projects and still retain their motion data. Parenting and grouping of objects is now included, and the floating hierarchy panel also serves as a useful object selection tool.

The new RAViX III engine produces great render results, with accurate shadows and highlights. Although using high-end settings can be excruciatingly slow, the EMO raster rendering was surprisingly quick on a small window and gave acceptable results given the origins of the package. EMO allows you to export all those nice textures and reflections as JPGs, TGAs or even SWF – but curiously not QuickTime or AVI.

Overall, *Swift 3D V3* should have a big impact on *Flash* Web graphics and the growing trend for micro games – especially since it comes in at under a quarter of the price of *plasma*, *3ds max's* vector output cousin.

The powerful RAViX III technology also makes *Swift 3D V3* one of the best graphics creation tools for *Flash*. While you may think the raster-rendering options a mere extra in a market of big players, think of it as a sign of things to come. By version 4 we could be looking at fully raytraced vector images with high-quality texture mapping. If you're looking at outputting your more sophisticated animations directly from *3ds max* or *LightWave*, plugin versions of *Swift 3D V3* will be available in early November. However, this standalone version is accessible to both high-end users and those coming in from 2D, providing 3D vector animation at an affordable price. ■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3D VERDICT 9

RANGE OF FEATURES	8
VALUE FOR MONEY	9

PROS **Excellent 3D tool for *Flash* >> Good easy-to-use tools >> Editable layers in *Flash* >> Cost effective 3D for the Web**

CONS **Limited 3D for character work >> Potentially long render times >> Can only import simple DXF or 3ds models >> Can't export to QuickTime or AVI**

[01] **Vector rendering using RAViX III gives accurate shadows, reflections, and transparency for *Flash***

[02] **Rendering in rasterized form using EMO generates rich textures and surface effects**

[03] ***Swift 3D* provides a simple and intuitive interface allowing even novices to get working quickly**

[04] **The latest version arms you with a gallery full of materials and animation presets**

REVIEW #079

Shave and a Haircut for Maya

This plugin is no shaggy dog story. Get cutting-edge control over hair in Maya

BY GEORGE CAIRNS

$800 (£511)

SUPPLIER JOE ALTER, INC CONTACT JOEALTERINC@HOTMAIL.COM WEB WWW.JOEALTER.COM FORMAT PC/MAC

MINIMUM SYSTEM
- Any Mac or PC capable of running *Maya 4.5*

MAIN FEATURES
- Hair and fur rendering
- Dynamic hair
- Full collision detection
- Supports instancing
- Interactive grooming
- Supports NURBS and polys, parametric objects, and splines
- Comprehensive material control
- Separate hair-rendering controls
- Self shadowing and scene shadowing

Hello Sir. Sit back and relax in the chair. What'll it be today? A goatee beard trim? A mullet perhaps? Or maybe something for the weekend? How about this *Maya* plugin from Joe Alter, Inc? Of course, creating hair in *Maya* is already possible – even in *Maya Complete*. You can use one of the many Visor brushes to paint 3D hair onto a NURBS surface. And with *Maya Unlimited* you get Maya Fur and the extra control that this gives you. So why do you need this plugin? Because it gives you unsurpassed control over where you can grow hair, how it looks, and how it behaves, of course.

As you'd expect, *Shave* enables you to select a whole surface as a source for instant hair growth. You can also specify exactly where you want your hairs to grow. On a polygonal surface you can target individual facets for hair growth, while on a NURBS shape you can even select specific isoparms and grow hair from these. *Shave* also grows hair between two or more *Maya* splines, so you can pretty much grow hair where you want on whatever surface type you like. As the shaveNodes are bound to the surface or spline they were grown from, they will track any motion or deformation applied to the source.

Once you've grown your hair, you can style it like Vidal Sassoon himself. You can edit a shaveNode's attributes like any other node with *Maya's* Attribute Editor. Sliders enable you to adjust hair count and the number of segments making up each strand. Texture Maps can also be used alter hair style. The Cut Map attribute allows you to add a texture map to control the length of the hair. If the map has areas that are 50% grey, then the corresponding areas of hair will be cut to half their length at render time. There's even a parameter for adding 'Mutant hairs'. These are random flecks of grey – as caused by magazine deadlines or noisy children.

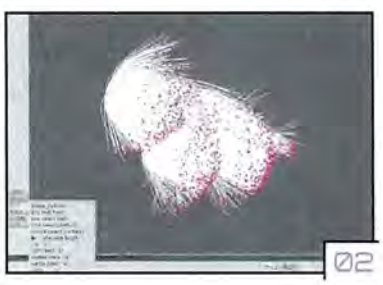
IF YOU CAN AFFORD THE PRICE, IT'S AN ESSENTIAL ADDITION TO YOUR TOOL SET

Shave helps reduce processing needs as your hair can be represented by a small number of guides. Each hair guide is a dynamic chain. You can set Dynamic properties using sliders or even paint on control with weight maps and textures. These dynamic chains also interact with *Maya* forcefields, so having wind ruffling your husky's fur isn't a problem.

Shave also comes with a decent PDF manual that takes you through the intricacies of virtual hair care. As hair is often used as a stand-in for grass (for an example, take a look at *Shrek*) there's a nice create-your-own crop circle tutorial that uses density maps to make shapes in grass.

To fine-tune your rendering you use the Attribute Editor to access the shaveGlobals.

01

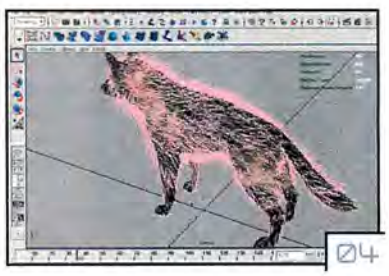


02

Here you can select the level of antialiasing applied to the shave buffer render. The available rendering quality choices range from Draft to the amusingly named 'Duuude.'

Overall, if hair and fur is your thing and you can afford the expensive cover price then *Shave* is an essential addition to your *Maya* tool set. But a quick word for Mac users: at the time of writing, *Shave* was only available for *Maya 3.5*, although the 4.5 version should be out by the time you read this review. ■

03



04

[01] This hirsute hound displays the amazing level of detail and render quality achievable through *Shave*

[02] Once you've applied hair to your character you can style it in the *Shave* interface using the various tools available. Comb away from the camera to get the hair following the model's body contours

[03] Shorten the length of the hairs, then fine-tune specific areas with the Scale, Translate, Stand On End, and Rotate Tools

[04] Use *Maya's* Attribute Editor to adjust displacement properties such as Frizz and Kink, then set other attributes such as Haircount. You get feedback in *Maya's* main display

VERDICT 7

RANGE OF FEATURES	8
VALUE FOR MONEY	7

PROS **Handy manipulation tools >> Dynamically driven hair >> Wide source of growth generators**

CONS **Only spotlights cast shadows on hair >> Slow render times for dense hair**

500 3D Objects

A cheap and convenient collection of quality 3D objects, in book and CD form

BY DAVE HOWELL

£25 ($40)

PUBLISHER TASCHEN ISBN 3822816213 WEB WWW.TASCHEN.COM FORMAT PC & MAC

MAIN FEATURES

- >> 500 complete photo-quality objects
- >> Easy navigation of CD contents
- >> Demo of *Swift 3D*
- >> Extraction mask and shadow map files included
- >> Offers a sample of the 1,200 models available on the DeEspona site (www.deespona.com)

At first glance this collection of 3D objects, presented as a CD and accompanying glossy book, seems to be little more than a clipart collection. But having these images to hand, and not having to search the Internet when you're in a hurry could be a godsend. All the images are presented in 3DS format, which means you should be able to import them effortlessly into your favourite package.

01

[01] **Even at medium resolution and with only 10,275 polygons, the quality of the images in the *500 3D Objects collection* is stunning**

Developed by DeEspona Infografica, most of the models in the collection are modelled in what the accompanying book calls 'middle polygon resolution', with 40 being modelled to photorealistic quality. Polygon counts vary from less than a hundred, all the way up to in excess of 160,000 for some of the photorealistic objects. File sizes, therefore, vary from 4K to over 3.5MB, while textures go up to a maximum of 2,500 x 2,500 pixels.

DeEspona has supplied not only the alpha channel file for extraction, but also the shadow and texture map, giving you complete control over each image. You also have the geometric data file so you can manipulate the images 'til your heart's content.

There are two groups of users who would benefit most from this software and book combination: novice 3D designers who have exhausted the sample images that came with their software, and more advanced users who need to work up fast visuals, but who don't have the time to build custom objects. The range may not be vast, but having these objects will allow any project's visuals to be realised with speed. ■

3D VERDICT	7
RANGE OF FEATURES	6
VALUE FOR MONEY	8

PROS **Cheap >> Clip maps and textures provided >> All models in 3DS format >> Mac and Windows compatible >> Full-colour image reference book**

CONS **Few anatomical models >> Only 40 high-resolution models >> Small number of organic objects >> *Swift 3D* software only in English**

Texturama

Don't like creating urban texture maps? Fortunately, someone's done it for you...

BY STEVE JARRATT

$99 (£63)

PUBLISHER 3ID MEGAMEDIA CONTACT +1 415 409 3742 WEB WWW.TEXTURAMA.COM FORMAT PC & MAC

MAIN FEATURES

- >> Contains 1,000 seamlessly tileable architectural textures
- >> High-quality images, averaging 1,000 x 1,000 pixels in size
- >> Variety of subjects including stonework, metals, plants, windows, and ceramics
- >> Thumbnail and full-size textures viewable using Web browser
- >> Includes 148 greyscale opacity/clip maps

The *Texturama* texture collection CD represents a pretty straightforward proposition: 1,000 seamlessly tileable image maps for use on buildings, fences, crates, furniture, and floorings. According to the author, it's taken two years to photograph and prepare the textures, and given their general quality, it would be hard to dismiss such claims.

The collection is divided into 13 categories, from construction features such as stone, concrete, windows, shrubs and bushes, to household items like glass, ceramics, and ornamental fixtures. As such, *Texturama* has instant appeal for anyone creating urban environments, preparing architectural visualisation, or who just needs a library of useful texture maps.

01

[01] **This image uses a clip map on a single plane to make the curly fence, and the grass, walls, and hedge are textured planes or blocks**

Greyscale clip maps are also included for images with holes (like gratings and so on). There are no bump maps supplied, but it's a simple enough process to import the coloured images into *Photoshop* and prepare your own.

Naturally, the usefulness of each texture varies depending on your circumstances. And if one were to level any sort of criticism at this collection, it's that the categories can be a little unpredictable: while the Brick selection covers a useful range of exterior colours and types, the Wood textures are rather more random, consisting mainly of fences, packing cases, and shingle roofs. Also, having been shot in San Francisco, there's a slight West Coast feel to the entire portfolio.

With the quality of today's digital cameras, it's not an unreasonable task to find and shoot your own textures, and *3D World* has even featured tips on making them tileable. But a library of 1,000 textures at a shade over six pence per texture? This is a pretty mean bargain, however you slice it. ■

3D VERDICT	8
RANGE OF FEATURES	6
VALUE FOR MONEY	9

PROS **Large file sizes >> Tileable textures >> Usefully themed >> Greyscale clip maps provided >> Only 6p per texture**

CONS **US-centric source >> Lack of bump maps >> Some inexplicable randomness >> Rolling your own often reaps greater rewards**

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MOVERS & SHAKERS

PRESS RELEASES TO: 3dworld@futurenet.co.uk

Buyouts, contacts, and big contracts: Movers & Shakers is your window on the 3D jobs market. And once you've read it, why not get a job of your own – with the help of our *classified section*?

MOVERS

KARL MOONEY has been named managing director of Mill Film. Mooney, who has served the company as visual effects supervisor on *Tomb Raider* and *Harry Potter and the Sorcerer's Stone*, will replace former managing director Antony Hunt. The change follows the recent decision made by Mill Film to centralise its digital film effects facilities at the Soho base and focus operations at Shepperton Studios on physical production.
www.millfilm.com

3D animator **MARTIN CARROLL** has joined CG animation house The Hive as a senior animator, bringing with him leading-edge skills in character animation and on-set visual effects supervision experience. Carroll joins The Hive following an impressive freelance career in London working on a range of creative and technically challenging TV commercials, broadcast graphics, and TV and film projects, including the recent Zurich Pensions commercials featuring the flying pigs, and adverts for British Telecom, Dyson, Fiat, Sugar Puffs, and Fairy Liquid.
www.hive3d.com

RICHARD NELSON is to join MPC's expanding 3D division as Senior 3D Animator. Richard joins from The Hive, where he's worked for the last five years. Previous to this, he was at The Film Factory, where he worked with MPC's Deputy Creative Head Lee Danskin, who also joined MPC recently from Smoke & Mirrors.
www.moving-picture.com

WHAT DO YOU DO, THEN?

WILLIAM ROCKALL

AGE: 38
JOB TITLE: Director
AT: Jellyfish Pictures
URL: www.jellyfishpictures.co.uk

WHAT DOES A TYPICAL DAY AT JELLYFISH ENTAIL?
Arriving late – ask anyone who has ever known me! I arrive at my desk and only move from my waist up until it's dark outside and time to leave. In the meantime I will have a mouse in one hand and a phone in the other and listen to Hober Internet radio, a truly amazing station that's often too inaccessible for any of us.

HOW LONG HAVE YOU WORKED IN THE 3D INDUSTRY?
About 17 years now, but it seems longer.

WHAT WERE YOU DOING BEFORE YOU GOT YOUR CURRENT JOB?
The same thing, but for someone else.

WHAT DO YOU LIKE MOST ABOUT YOUR JOB?
My daughter going mental when she sees our work on TV.

AND WHAT DO YOU LIKE LEAST?
Unnecessary changes.

HOW MANY HOURS DO YOU HAVE TO WORK EACH WEEK?
It always varies depending on deadlines. Although we now tend to be able to manage things so that weekends aren't often totally lost to working.

ARE THERE ANY PERKS?
There are often fans outside the door, though unfortunately they haven't come to see me. As for the travel and freebies, well, there are no free lunches, are there?

WHERE DO YOU HOPE TO BE IN FIVE YEARS TIME?
I'd like to say watching my koi carp swimming in a pool in our garden in Thailand. But I suspect I will still be watching this render...

WHAT ONE PIECE OF ADVICE WOULD YOU GIVE TO A YOUNG 3D ARTIST HOPING TO BREAK INTO THE INDUSTRY?
Keep it simple.

■ You can see more of William Rockall's work on page 50 of this issue, where our character rigging tutorial covers Jellyfish Pictures' work on Universal's recent *Rock Monsters* TV advert (included on the cover CD)

SHAKERS

NXN SOFTWARE has signed up leading games developers Kuju Entertainment and Argonaut Games to the *NXN alienbrain* system. Argonaut had been looking for a digital asset management solution when its satellite studio in Oxford strongly recommended *alienbrain* after using the package for over a year. After seeing the system in action at the Game Developers Conference in March this year, Kuju, too, bought into the NXN technology, after completing an exhaustive test of comparative asset management technologies, finding *alienbrain* to be the only solution capable of managing all aspects of workflow on its large projects.
www.nxn-software.com

The School of Computing and Mathematical Sciences at Glasgow Caledonian University has bought 25 licences of **SOFTIMAGE|XSI** to develop its recently established Advanced Masters in Games Technology course. The course, which begins in October 2002, is aimed at computing graduates seeking a career in videogame design and programming.
www.com.gcal.ac.uk

Videogame developer and publisher **CAPCOM** has adopted the *SOFTIMAGE|XSI* system as its main game authoring solution. Capcom, which has been using *SOFTIMAGE|3D* to create hit games titles such as *Dino Crisis* and *Resident Evil*, is now a major player in the videogame market.
www.capcom.com

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EXHIBITION

FOR MORE IMAGES, SEE THE COVER CD

EXHIBIT YOUR CREATIONS

If you're an up-and-coming 3D artist, our Exhibition section is the place to showcase your work. Each issue, we display the best illustrations and animation stills to have been produced outside of the major design houses. To get your own images included, just follow the submission guidelines below.

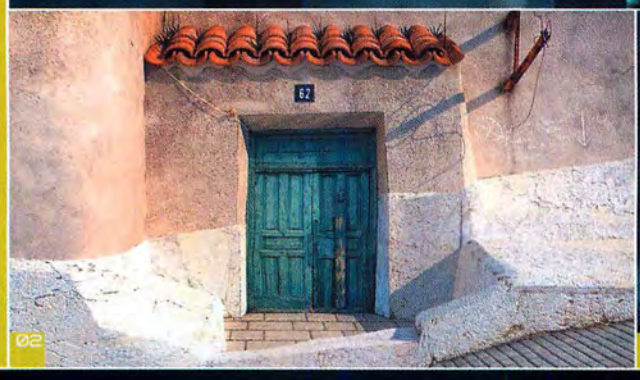
Please note that contributions must be submitted on the basis of a non-exclusive worldwide licence to publish, both in printed and electronic form, by *3D World*.

We also regret that we cannot reply to every letter or email we receive in person. Selecting and assembling the images does take time, so if your work has not yet been published, please be patient. If we feel your contribution is suitable, it will appear eventually: either in the magazine, on the cover CD, or on our Web site.

SUBMISSION GUIDELINES

- Ideally, images should be rendered out at least 3,000 pixels wide or high.
- Images under 500 pixels in size will *not* be used in the magazine.
- Nor can we print smaller images that have been resized in *Photoshop*.
- Always include a text (.txt) file with your images containing the following things:
  - Your name
  - Your email address
  - The URL of your Web site
  - The title of each image
  - How the image was created
  - The software you used to create it
  - A little bit about yourself
- Don't feel obliged to write pages: around 200-300 words of text will do.
- Don't rely on a separate covering letter: we have a tendency to lose those!
- Files under 3MB in size can be emailed to 3dw.exhibition@futurenet.co.uk
- Larger files may be sent on CD or Zip disk to: Exhibition, *3D World*, 30 Monmouth Street, Bath, BA1 2BW, UK
- We can't return your CDs/disks, so please don't send us your originals!

ON THE CD
More Exhibition images.



#089

02

01

01 FEDERICO COSTA ALISEDO
LUBNA, PIZARRO

USING: *Maya*, *Photoshop*

"I am a French Argentinian living in Paris. For the last five years I've worked as an Art Director for a major music magazine in Argentina. I had a great time and acquired solid experience on team work and deadly deadlines. However, six month ago, I decided to move back to Europe with one goal in mind: character design for the CG industry. Hence, I've been putting together a portfolio to help me land an opportunity in this field.

I made these images for a competition ['Realtime 3D Video Game Artistry', hosted at www.cgchat.com] whose brief was to create good and evil characters using texture alone to differentiate them. I used the transparency map to emphasise the gender distinction, hiding parts depending on the intention. For the angelic Lubna, I searched for a serene style combining transparencies, whites, and blue hues. As for the harsh Pizarro, I chose more contrasting blacks, reds, violets, and blues. I performed the modelling, wrapping, and rigging in *Maya*, and painted the textures in *Photoshop*. The whole task took me eight full days of work."

[e]: fedron2@yahoo.com.ar

02 JUAN SIQUIER
(L-R) THE SLOPE, DIAGONAL OF LIGHT, EL PATIO INTERIOR

USING: *3ds max*, *VRay*, *Photoshop*

"I was an exhibiting painter until I made my first 3D scenes in 1994 with *3ds max 2*. In 2000 I decided to commit entirely to the 3D medium. My website includes galleries of both my 3D and traditional art, as well as fragments of my music and other interesting things.

The Slope is a street in a town of Albacete. I captured the textures with a Nikon Coolpix 775, lit the scene with a single directional light, and rendered it with *VRay*. For Diagonal of Light I wanted the walls, windows, and handrails to give the image a very cold look. I hand-painted the graffiti and dirt in *Photoshop*. *El Patio Interior* is the view from my room in my parents' house. I made the illumination with a dome of spotlights with diffuse shadows, one strong directional light with raytrace shadows, and some omni lights distributed strategically throughout the scene. I altered the textures in *Photoshop* to give the impression of erosion and dirt."

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[w]: www.juansiquier.com

EXHIBITION

01 MOYRA
ALCHEMY – A SPIRITUAL VALENTINE

USING: *Poser 4*, *Corel Painter 6*, *Photoshop 6*

"Once a writer, astrologer, and landscape and interior designer, I began working in digital art in 1992, in an attempt to translate my surreal and spiritualised paintings from canvas and paper to pixels. My passion for 'painting with light' has consumed me since the beginning, and I now feel blessed to be able to work full-time as a digital artist and 3D texturist.

The inspiration for *Alchemy* was the alchemical process we all undergo through the crucible of relationships. I sketched all the elements – the arms cloaked in golden armour, the hands, the elements in the four corners of the image, the entwining vegetation, and the chemical symbols – on paper before I started. In my more personal work, exemplified by *Alchemy*, the images exist to tell a story, and each detail is carefully thought out. I chose the predominant colours of the image, a mix of purples and golds, using complementary colour theory, and because both have spiritual significance in many traditions."

[e]: she@they.com
[w]: www.renderosity.com/gallery.ez?ByArtist=Y&Artist=Elusion

02 ANSON HUNG
MODEL TRAIN

USING: *Rhino 3D 1.1*, *3ds max 4.2*, *Photoshop 6*

"I'm 19 years old, live in Toronto, and am fresh out of high school. Everything I know about 3D is self taught, slowly but steadily. I made the train, which was inspired by an actual model in my room, in my spare time. I modelled it in *Rhino*, then textured and rendered it in *3ds max*. I painted the textures and touched up the render in *Photoshop*."

[e]: anson@jun-tao.com
[w]: www.jun-tao.com

#091

03 HOSSAM HASSAN MEAWAD
(CLOCKWISE FROM TOP LEFT) THE GREAT TOWER OF MAGIC, OLD CAR, COUNTRYSIDE A, COUNTRYSIDE B, VIKING, 221930

USING: *Vue d'Esprit 4*

"I am 17 years old and was born in Cairo, Egypt, where I got my inspiration and developed my talent for art. My family moved to London, England, where I lived until I was nine, then moved to Canada, where I first became interested in digital art and began to learn how to use *Vue d'Esprit*. I have used *Vue* every day for the past year and have made lots of great images.

I give *Vue* a 10 out of 10 for the work I have produced with it, but I want to expand my possibilities and skills by learning something new such as *3ds max* so that I can combine the two programs and make even better images. I have a lot of fun working in 3D, and I believe my future will rely on the skills I'm developing in this area"

[e]: masryoon@hotmail.com
[w]: www.renderosity.com/gallery.ez?ByArtist=Yes&Artist=masryoon

EXHIBITION

01 SALLIE RICHARDSON
STONE INN

USING: *Poser*, *Vue d'Esprit*

"I'm 46 years old and have been working with 3D for about two years now, but I've been into drawing since I was around ten years old. I'd like to take this opportunity to thank everyone in the forums for all the help, advice, and generosity they have shown me.

I rendered *Stone Inn* in *Poser* and saved it as a PZ3 file so it could be imported into *Vue*. The small flowers are *Vue's* BonnyClump flowers with new colours added to them, grouped together and saved as a *Vue* object. All of the other plants and trees are *Vue* plants. Other than arranging and sizing, there was no secret formula for this image: I simply arranged it to my liking. There was no postwork at all."

[e]: graniegirl@1st.net
[w]: www.renderosity.com/gallery.ez?ByArtist=Y&Artist=pokeydots

02 NORBERT GARAJ
RAINFOREST, STILL LIFE

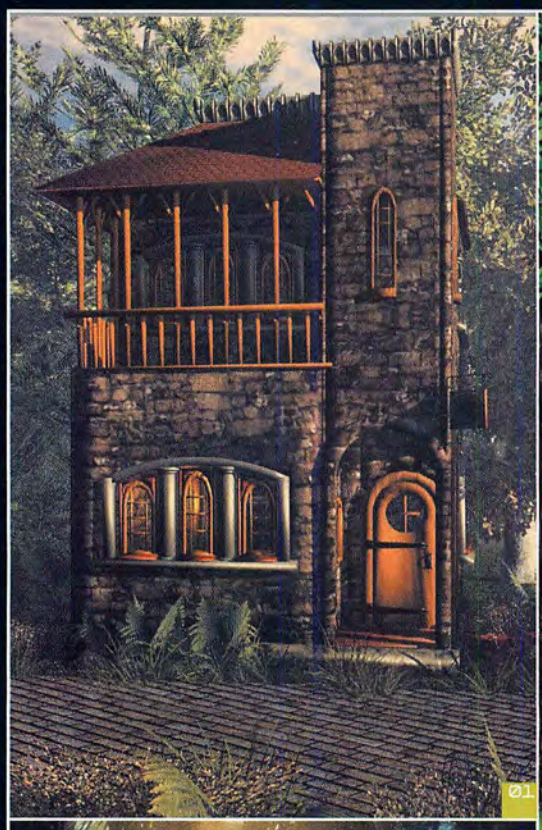
USING: *Vue d'Esprit*, *Photoshop 5*

"I'm 29 and work for an insurance company in The Slovakian Republic. My drawing skills were always extremely poor, so I was amazed when I first saw computer graphics in 1988. I recognised that this medium could help me realise my visions and ideas without pencil and brush, but I had to wait 'til 1997 before I got my own PC. I have been experimenting with computer graphics since.

I began with photo compositions and collages, but I soon found programs like *Terragen* and *Bryce*, which gave me my first taste of 3D. Now I use *Vue d'Esprit* to create photorealistic landscapes and other compositions, and use *Photoshop 5* for postwork.

I'm fairly new to 3D and not yet capable of creating my own models, so I use free models available at Renderosity. How did I create my images? Well, it's hard to explain – momentary inspiration, an idea in my head? Sometimes I start to make something and the results are completely different from my intention. I created and rendered Rainforest in *Vue d'Esprit*, then adjusted the colours and added blur in *Photoshop* for a more appropriate atmosphere. Still Life is pure *Vue d'Esprit* without any postwork. I was really satisfied with the result.

[e]: deadhead@centrum.cz
[w]: www.renderosity.com/gallery.ez?ByArtist=Y&Artist=deadhead



#093

03 ADAM BELTON
BIKER TED

USING: *Imagine, Extreme 3D 1.0, trueSpace 2 and 3SE, Cinema 4D SE, Poser 3, Bryce 3.1, Amapi 4.15, xRes 2, Satori PhotoXL 2.2, Painter Classic*

"I'm the primary carer for my mentally disturbed son who requires 24-hour supervision and care, which basically means I have no money and can't afford graphics software. All the software I use for graphics is free cover-disc software, and I hate it when people say, 'You can't do anything with free software!' Some of us have no choice. I would love to have *max* or *Maya*, but I know I never will. I'm anti-piracy so I refuse to have anything to do with pirate software, the main reasoning being is that I expect the same laws to protect my images, and I can't be a hypocrite.

I don't tend to think in terms of models, textures and so on any more, but in terms of finished images. I treat my monitor like a canvas and I 'sketch' in 3D, so I suppose you could say I'm more of a traditional artist. None of my images has been created with money in mind, although one day I hope to sell some on their own merits – because people like what they see.

Apart from *Bryce*, which was a present, all of my software was free and came without manuals. I have learned everything I know about 3D by banging my head against my monitor and it's taken me ten years to get to this point. I hope you don't think I've wasted my time.

[e]: adam@themindzone7863.fslife.co.uk

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THE SCIENCE BIT

Gainward is currently the only manufacturer that provides a Twin DVI output, including the DVI/VGA converters for complete, forwards-compatible products. An integrated transform and lighting engine with 32-bit colour and 32-bit Z stencil buffer aided by cube environment mapping and true reflective bump mapping backed by multibuffering ensure smooth animation and video playback.

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■ To be in with a chance of winning one of two Ultra/750 graphics card bundles, complete with 3D glasses, follow the instructions on the right. For more information about Gainward, visit the company's website at www.gainward.net.

HOW TO ENTER

The contest is open to any 3D artist throughout the world who is not in any way connected with Future Publishing or Gainward. To enter, email the answer to the following simple question to **3dw.competition@futurenet.co.uk**, including the words 'Gainward competition' in the Subject line. Good luck!

Q: HOW MANY DVI OUTPUTS ARE THERE ON THE ULTRA/750 XP GOLDEN SAMPLE BOARD?

CONTEST SPONSORS

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THE RULES

The competition closing date is December 31 2002. Employees of Gainward or Future Publishing, or any of their agents or families, may not enter. Multiple entries will not be accepted. The editor's decision is final. There are no cash alternatives. No other correspondence will be entered into. If you do not wish any of the companies involved in this competition to contact you with further offers, indicate this on your entry. Future Publishing will not pass your details on to third parties.

PITCH BLACK

Double Negative's Paul Franklin recalls his studio's debut work on the cult sci-fi/horror flick. Afraid of the dark? You will be... **BY MARK RAMSHAW**

ABOVE **Representing lead character Riddick's ability to see in the dark required some extra CG effects. "The effects budget for both Double Negative and Magic Camera Company [which completed around 100 other shots] was something like $5 million," reveals Double Negative's Paul Franklin. "We managed to stretch that money quite far."**

Pitch Black is the movie that made it against the odds. Languishing unreleased for a year, this $35 million production became a candidate for straight-to-video hell. But somehow it clawed its way back out of obscurity to reach number one at the American box office, despite the fact that the effects were put together on a minimal budget by a brand new UK studio.

Paul Franklin, head of CG at Double Negative, explains how he got involved. "The film was the last to be produced under the Polygram Filmed Entertainment banner. They'd worked extensively with Peter Chiang, and he in turn had worked with myself and a bunch of other guys in Soho. For *Pitch Black*, Peter suggested we all come together to work as a team."

As a result, the first day of the movie's production was also the day Double Negative came into being. "Peter was confident about the skills of the team, so it wasn't actually too much of a concern that we didn't even have a base for the project a the time."

Without a full team, and with no offices, Franklin and two colleagues headed out to Australia's Gold Coast to work alongside director David Twohy (screenwriter of *The Fugitive* and director of *The Arrival*) on the 12-week shoot. "We felt it was important to have the 3D character team out on set," Franklin says. "Meanwhile, the rest of the guys back in London were busy putting the rest of the team together and building the facility. When we finally returned, it was almost like the place had appeared overnight."

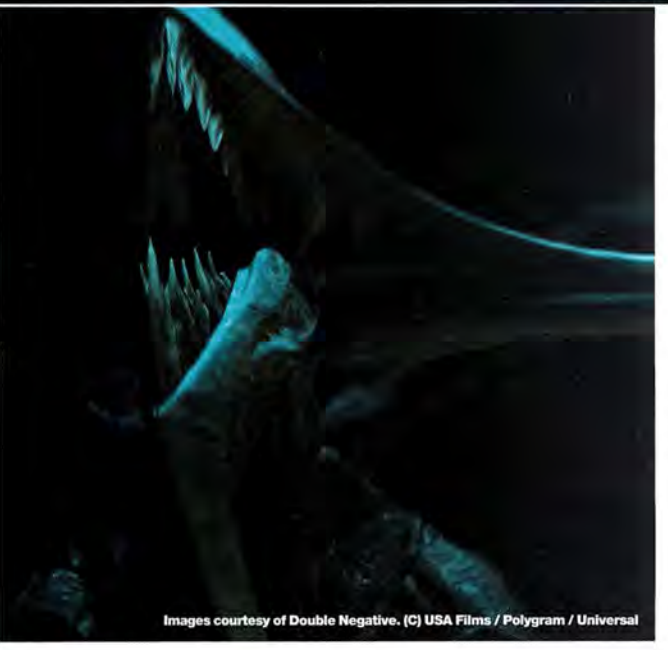
> "MAYA WAS THE NEW THING, BUT WE WERE USING THE 1.0 RELEASE, AND IT WAS PRETTY ROPEY" **Paul Franklin**

The creature was conceived by monster supremo Patrick Tatopoulos, a veteran of *Independence Day* and *Godzilla*. "His involvement had been to create the original drawings, and his studio had built early maquettes," says Franklin. "But while the actual physical structure was locked down, the way it moved, behaved and even stood, was unclear. Patrick's drawings are very expressive and elegant, but we needed to take them further to create a creature that would be a living character in a film."

Tatopoulos' design somehow takes familiar elements and makes them appear original. "It has wings and claws, it can leap through the air, stand on its tail, and then there's this huge head with incredible jaws, and more teeth inside the jaw. It's almost like Patrick took a bipedal creature and then mixed up all the body parts."

Down on the set, the team began building a character rig, opting to use *Maya* – which had been released just one week before work began. "We had a new film, a new company, new 3D software, and we were 10,000 miles from home," laughs Franklin.

"Myself, Julian Mann [lead creature setup TD], and Elie Jamaa [lead modeller/enveloper], had all been big users of *Alias PowerAnimator*, but decided we wanted to do this one in *Maya*," he continues. "It was the new thing, so we thought it was the way to go. But we were using the 1.0 release, and it was pretty ropey in some respects. We found there were a number of things it couldn't do. Luckily, we were able to write our



Images courtesy of Double Negative. (C) USA Films / Polygram / Universal

LEFT **An extreme close-up of the creature model created by Double Negative for *Pitch Black*. The extreme level of detail was achieved with the help of 3D scanning solution *CySlice*. "We worked with Headus as they were developing it, working to extract the difference between the original poly mesh and NURBS surfaces, then exporting this as a 16-bit displacement map to provide extra detail," says Paul Franklin. "It worked so well we actually had to go in and clean up a couple of areas where you could see a sculptor's thumb print."**

way around the problems. We'd write a utility to sidestep bugs, or add features that weren't there. Julian would come up with new ideas, then myself and creature animator Derek Wentworth would test them out, and send the rig back again. Julian would be doing two or three setups daily. He must have rebuilt the whole creature no fewer than 20 times."

The trip to Australia proved extremely useful, enabling Double Negative to respond to the needs of the film-makers, and also help come up with new sequence solutions. "As our character was evolving, so their idea of what they wanted in the shots was developing beyond the rather dry descriptions in the original story," explains Franklin.

Undoubtedly, the fact that the creatures appear during an eclipse played to the advantage of the CG crew. "They realised they didn't have the budget for a lot of scenes where you get a full view of the creatures."

CLEAR AND PRESENT DANGER

Even when they are in full view, the creatures still impress, though. One such scene occurs when the bounty hunter (played by Cole Hauser) meets his end. As he is butted by one of the creatures, splitting his head in two, viewers get a full view of the creature's own impressive head and neck. Much of the detail is obviously down the rigging and animation talent (the suggestion of muscle using weighted clusters on the skin and secondary soft body dynamics works particularly well), but Franklin is also keen to credit the work of Double Negative's 2D team.

"Everybody always concentrates on the 3D, but a lot the success of the CG in the film is down to the work of our compositors. I think we have some of the best in the world," he said.

In addition to securing the movie's status as a monster-laden sci-fi classic, Double Negative's 125 effects shots, which includes some 100 creature shots plus the flocking bat-like creatures and also the opening sequence, provided the new studio with a perfect showreel. This in turn has led to work on blockbusters such as *Enemy At The Gates* and *Die Another Day*. Work is also about to begin on *Tomb Raider 2* and *The League Of Extraordinary Gentleman*.

And of course, with star Vin Diesel's new box office status, it's no surprise that *Pitch Black 2* has been given the green light, with a third movie already in the pipeline. "David wants the trilogy to be seen as a sort of anti-*Star Wars*," says Franklin, half jokingly.

Having just worked again with David Twohy and Peter Chiang on *Below*, there's every likelihood that Double Negative will once again be called upon to deliver key digital effects. With a budget around three times that of the original (around $100 million compared with $30 million), the next adventure is due to hit cinemas in 2004. ■

PLAYING WITH FIRE

Paul Franklin sheds light on the genesis of Pitch Black's fire-breathing signature shot

"In the original script, the character of Paris is killed when he wanders off into the dark and a creature swoops down and lifts him out of shot. The film crew tried to achieve this using an animatronic creature, but it didn't work.

"At the same time, David Twohy was looking for ways of putting light into the scenes, and it just so happened that the actor playing Paris was a trained fire breather. So instead of the original death, the idea evolved for him to take a last drink. As he does he's speared from behind by one of the creatures, which causes him to spit the alcohol onto his Zippo lighter.

"That lights the whole scene up, illuminating a whole circle of the creatures closing in. The result was one of the most dramatic moments in the film, and certainly showed the value of circus skills!"

ABOVE **"The modellers did a great job optimising the geometry of the monsters," says Paul Franklin**

ABOVE **"Traditional lighting would have shown too much," he adds. "We had to cheat it by using shaders."**

FACT FILE

TITLE: *Pitch Black*

DIRECTOR: David Twohy

ART DIRECTION: Michael Collery

DURATION: 108 minutes

WEB: www.pitchblack.com

PREMIERED: 2000

CREATURE EFFECTS BY: Double Negative (other digital effects by Magic Camera Company)

CONTACT: www.dneg.com

NUMBER OF SHOTS COMPLETED: 225 (125 by Double Negative)

OTHER CREDITS FOR DOUBLE NEGATIVE: *Randall & Hopkirk (Deceased)* (2000), *The Tenth Kingdom* (2000), *Mission Impossible II* (2000), *Nutty Professor II – The Klumps* (2000), *Enemy At The Gates* (2000), *The Tailor Of Panama* (2000), *Captain Corelli's Mandolin*, (2001), *Bridget Jones's Diary* (2001)

BACK CHAT

James Whittington

Times are tough for 3D studios, reckons James Whittington, president of market research company TrendWatch. However, there's light at the end of the tunnel – although you'll never guess which sectors it's coming from... **BY STEVEN RAYNES**

WHAT SHAPE IS THE 3D INDUSTRY IN RIGHT NOW?
Like many industries today, economic uncertainty is making life difficult for those in 3D – studios and vendors alike. With shrinking marketing budgets, studios that focus on commercials, special events, or even exhibition marketing have to be feeling the heat. In a nutshell, things are tough right now, and may not get much better until late 2003.

WHAT SPECIFIC CHALLENGES DO STUDIOS FACE?
One of the toughest challenges is just staying in business. With downsizing running rampant among companies in the US, we can expect budgets to be cut and studios of all sizes to get fewer or smaller projects. There's a particular risk for smaller studios because the big players are often forced to move 'down market'. This means that they may take projects from smaller clients (or just smaller projects from the same clients), and this puts significant pressure on other studios, because the big guys are now calling on the people who used to keep them in work.

SO HOW DO THE SMALLER STUDIOS COPE?
Unfortunately, there aren't any magic answers. In today's economy, studio owners need to be sure their key employees are solidly in place, that reels are kept up to date, that marketing and selling activities stay focused, and that they actually take the time to see clients and win new projects. At the same time, they must manage current projects to ensure their pipelines stay efficient and productive, hopefully translating into on-time, on-budget delivery.

What's interesting is that so many of these studios (44%) reported in our surveys that creating and producing their own demo reels is a challenge, I suspect that many may not be keeping their demos up to date. It's easy to see the importance of reels in attracting new clients, yet when we look at the size of most studios – less than ten employees – you can understand why they don't have the time or resources for this important task.

AND THE BIGGER ONES?
To get that next 'envelope-pushing, mind-bending' new project, studios are faced with not only showing off their work, but using their production capabilities as sales tools. In fact, in our surveys of effects and animation studios, production capabilities are seen as a top tool for capturing new business. We're starting to see what the treadmill looks like for owners of many studios: finish the current projects, make demo reels, go after higher-profile clients, invest in the people to make the magic, hope to deliver on-time and on-budget – and all the while creating award-winning stuff, making more demo reels, fishing again for bigger clients... and so on.

SOUNDS LIKE HARD WORK. IS IT ALL DOOM AND GLOOM?
There are some bright spots. For instance, things are looking up for those working on feature film projects. *Shrek*, *Monsters Inc.*, *Jimmy Neutron*, and *Ice Age* were very successful, and interest in 3D animation has spiked, which should make it easier for studios to find backing for projects. Studios also see new business opportunities coming from industrial video projects, TV broadcast content/commercial projects, and interactive media projects.

And even with the focus on getting that next new project, studios say their production capabilities are paramount. When we put this together with our other data, it suggests that studio owners are quite bullish about the future, and are using this 'slow time' to reassess the direction their companies are moving in and to put together the pieces to handle the next wave of growth.

WHAT ABOUT GAMES? IS THAT STILL A GROWING INDUSTRY?
We're often asked about the games market and what's going on there. Although we're not yet doing research in the field, we do see this as a hot area for 3D. Certainly, there's a lot of interest in this topic when talking about the effects and animation business. Our research shows that one in five effects studios are doing complete design/production work for games and almost one in three are doing animation.

SOUNDS EXCITING. BUT WHAT'S THE NEXT BIG THING FOR 3D?
I was chatting with one of our market experts, Barbara Robertson, about the emergence of Machinima [the use of game engines to render 3D animations in real time]. Machinima artists work from scripts and direct 3D actors and action as if they were working on live-action films. Barbara believes it won't be long before the hardware and engines will be much more sophisticated, and Machinima will open doors in 3D for users of all types – pros, prosumers, and even everyday consumers. Machinima-specific software tools are just around the corner. Another thing we're watching very closely is 3D on the Web. It's been the next big thing for a while, but so far has not yet materialised in the way so many have predicted.
Adoption of broadband and faster computers play a role in driving this trend. We're about to see an explosion in this area very soon...

Scenes from *Hardly Workin'*, a Machinima film directed by Paul Marino. Could Machinima be the Next Big Thing for 3D?

He's seen the future: but is it pretty? James Whittington, founding partner and president of TrendWatch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